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## EDITORIAL NOTES—GAS, &c.

### A Presidential Address.

THERE is pleasure in reflecting upon such meetings as the one that the Eastern Counties Gas Managers' Association held at Leighton Buzzard on Thursday, under the presidency of Mr. C. F. Ruggles, the Engineer and Manager of the Gas Company. Everything possible was done by the Chairman and Directors of the Company to make the time disengaged from the business proceedings pleasant to the visitors; and there was a chorus of appreciation over what they did. The technical portion of the business meeting comprised only two items; and they were quite sufficient. We seem to detect a disposition all round the district organizations to drop the futile endeavour to squeeze more into the time of a meeting than it will comfortably hold. There is no good got out of satiety in this shape any more than there is in another and more common form. The members at the meeting tire, interest slackens, and the haste shown in the latter part of the meeting, in order to press the whole into a reasonable time, results in superficial and ragged comment. The value of the meetings is thus considerably depreciated. On this occasion, the Presidential Address of Mr. Ruggles and a paper by Mr. John Young, of Hull, constituted the sole technical features of the meeting. Mr. Young's communication is treated upon in a separate article.

In regard to the presidential address, Mr. Ruggles, both in matter and delivery, infused into it much of a well-known and popular personality. Whether he was dealing with the affairs of Leighton Buzzard in particular or topics of contemporaneous importance to the gas industry in general, he riveted attention. For such a concern as that existing in this small Bedfordshire town, with its staid population, there has been a remarkable success in the gas business, which the President attributes to the liberal manner in which the consumers have been treated by his Directors. But there has to be management, diplomacy, initiative, and other things besides liberality in encouraging a full measure of prosperity under such inelastic urban conditions; and there is no difficulty, after reading the address, in tracing the source of much that has been done, both for the consumers and the shareholders. With a present output of 53 million cubic feet of gas per annum, a capital standing at merely £377 per million is something that can be referred to with a greater prospect of exciting envy than mirth. For undertakings of small and large growth, there are several leaves that might well be extracted from the book of experience at Leighton Buzzard. Mr. Ruggles advocates the discount system both for prepayment and ordinary consumers. To the former, he finds it cheaper, on general reductions of price, to allow a discount than to alter the mechanism of the meter; and the consumers knowing their part proprietorship in the money in the box take good care of the meters, and in the event of removal do not forget to announce the fact at the gas office. In the case of the ordinary consumers, the discount system tends to decrease the cost of collection. As a matter of fact, this is an altogether cheaply conducted concern, though situated in a district that rather operates against economical administration.

The gas industry—speaking of it now as a whole—has expanded at a remarkable rate; but expansion generally has not yielded that extended controlling power in respect of purchase and sale that might have been reasonably expected. The President is manifestly disappointed with the present condition of things; and he finds in that condition an abundance of work for the Commercial Sections of the District Associations. The Commercial Sections have had our full support; but we fear they will fail grievously in their purposes if they attempt to get beyond their legitimate functions of being the disseminators of valuable trading information, and of affording opportunity for informal discussion of commercial topics. They must keep their hands off the purely administrative work, if they are not to come into conflict with their administrative bodies. A suggestion put forward by Mr. Ruggles serves as an illustration. In the Commercial Section of the Eastern Counties Association, there are represented 36 works purchasing upwards of 512,000 tons of coal annually; and he is of opinion that the Commercial Section might take up the question of the purchase of coal with very real advantage. The representatives in the Commercial Sections are drawn entirely from the officials of gas undertakings; and with all respect we do not think there would be any guarantee of a perfect peace and satisfaction through a delegation of coal purchases in the manner that he proposes, particularly in the case of local authority undertakings. In unity there is undoubtedly strength; but to deal effectually with such questions as that of coal purchases, the unity must incorporate administrative bodies as well as executive officers. It is because there is not this unity that the coalowners have been enabled to maintain, under weak conditions, a strength that has been real enough to, in large part, accomplish its object of holding prices at a higher level than has been normal under circumstances similar to those ruling this year. The President also considers there is scope for further activity by the Commercial Sections in the matter of coke and tar. The work there again can only be informative—nothing more; and even such work will always be more or less crippled by those who keep themselves aloof from the intelligence conveying operations of the sections. Whatever the Commercial Sections may do, the laws of supply and demand and of self-preservation will always show how effectual is their undermining power.

These points, however, do not exhaust the list, as advanced by the President, of possible usefulness by the Commercial Sections; and here an easier task is imposed, and would be good if it did not suggest a work of supererogation in the adoption of new agreements between gas suppliers and prepayment meter users and the tearing up of their old ones. The wave of prepayment meter popularity rolled along so briskly a few years ago that time did not permit of the framing of a code of regulations that might have common applicability; and Mr. Ruggles now hints that no better work could be performed by the Commercial Sections than the drafting of some universally acceptable form of agreement. Under the existing prepayment agreements, gas undertakings are not doing badly; and most of them would be loth to disturb in any way the relations between those customers and themselves, or to arouse the suspicion which changes of the kind generally bring, among a certain class of people, in their train. These are but a few of the topics dealt with by Mr. Ruggles in an address containing both interest and suggestion in every paragraph.

### Gas-Works and Tar Distillation.

WHAT shall we do with our tar? The question is one of those of interminable perverseness that persist in disturbing the even course of the polity of the gas industry, not only at home but abroad. Only recently we have had private communications from Germany—the seat of the great coal-tar colour industry—in which confession is made by one writer that he is seriously contemplating the heating of his retorts with tar, for the product, in view of the situation of his works, is for him next door to a waste material. The question is not therefore one that has geographical limitation, but it is spread far and wide; and, this being so, the situation is the more serious. There is hope that the new demand for road purposes will do something to relieve the market; but the deeper the consideration given to the general situation, the more apparent it appears that, under present conditions, new outlets can only offer sufficient resistance to assist in

arresting the downward tendency of tar. For small mercies, we must be truly thankful. The question has to be looked at fairly and squarely. Not only has tar been getting, taking the average, more sickly in price the last few years, but tar products have simultaneously to an extent been pursuing the same course. There is a proneness in such matters as this to seek for some door against which to lay blame; and abuse has been piled up against the door of the tar distiller—and much too liberally. Tar distillers are only human; and, naturally, they look with keener sympathy on their own position than on that of their customers. There are, however, certain ruling events in the markets in which they vend their products which they cannot control; and those who know this best among gas manufacturers are not those who sell their tar, but those who distil it, and have the resulting products for sale in company with those whose sole business is tar distilling. This depression of tar and tar products largely resolves itself into a question of supply and demand. The output of tar is increasing through the enlarged quantity of coal carbonized; the practice is extending of recovering the secondary products in connection with coke-ovens, blast-furnaces, and so forth; and in the tar products competition, the expansion of production, and the greater local availability to purchasers of the products on competitive offer have naturally a tendency to lower prices. The brokers, too, are accused—by Mr. J. H. Brown, of Nottingham, as will be seen by our report of the discussion at the Eastern Counties Association meeting last Thursday—of having been the means of working an amount of evil to the market; but that is one of those questions upon which there can only be judgment after hearing both parties.

This question of the price of tar crops up again through the reading of a paper by Mr. John Young, of Hull, at the meeting referred to above, on the subject of "Tar Distilling "in Medium-Sized Gas-Works." But truth to tell, the paper does not afford much light or leading. This is not the fault of the author. He properly declines in this matter to adopt, in the nebulous circumstances of the times, the *rôles* of guide, philosopher, and prognosticator. He has a tale to tell, and he tells it. But from it there is no particular moral to be drawn. What he, in effect, says is that every gas manager must take his own individual circumstances into consideration, weigh up all the possible material effects from two courses of action—continuing to sell his tar production to the distillers, or enter upon the work of tar distilling—and proceed accordingly. It is a many-phased question, the determination of which is beset with much difficulty. Mr. Young only addresses himself to "medium-sized works"—a designation the interpretation of which he leaves to his readers. It, however, discloses the fact that Mr. Young has in mind a size of gas-works below which it would be, under almost any conditions, unprofitable to enter upon tar distillation, notwithstanding that, as a general proposition, it is better to pay carriage upon products of higher value than upon raw material of lower value. There is no analogy between tar and tar products and ammoniacal liquor and sulphate of ammonia, in which latter case so much carriage has to be paid upon the waste in the raw material, which expense can all be saved by concentrating the value of the liquor in the form of sulphate of ammonia, which, furthermore, has a freer market than certain of the products of tar distillation.

But it may be taken as axiomatic in relation to tar distillation, that the greater the subdivision on the lower scales of working, the greater becomes the ratio of working expenses to market values. From this point of view, the smaller gas-works would be ill-advised to enter upon the distillation of their tar, more especially when the energies of those who would be responsible can be more profitably devoted to the primary business of the undertaking. Of course, there are situations where it might be to the advantage of a number of small works to pool their tar, and have a tar distillery common to the contributory undertakings. The tar distillers appear to get a fairly good living out of the business; and the small undertakings, by united action, might save for themselves the profits so made by others. Mr. T. Glover, however, appears inclined to discourage the spread of the distillation of tar by gas undertakings on certain grounds—one of which is that it would tend to further lower prices by increased production. It is difficult to see how this would materially affect the position, except in respect of competition in localities where certain of the products might have a ready sale. Looked at from the standpoint of production only, it is not altogether apparent how the place of manufacture of tar products—whether it be at the tar distillers or the gas-works—would have much, if any, influence on the market. Individually considered, however, the position of gas-works for disposing of tar and tar products, capacity for keeping a tar-distilling plant in fairly constant running, and cost of conveyance, are factors, whatever the size of works, that must enter largely into consideration. Tar distillers working on the large scale, and having the whole range of secondary products to produce a better balance-sheet—some products rendering compensation when others are depressed—are, of course, in a better position than the small or medium-sized gas-works tar distiller would be under his circumscribed conditions. Therefore, taken on the whole, the advice of Mr. Young and Mr. Glover—that, where tar contracts can be made on a sliding-scale in preference to a fixed price over a period, it will, in most cases, be found much better than entering upon the business of tar distillation—should not be lightly discarded, but should be taken seriously as the deliberate opinion of men with practical experience of tar distilling.

Regarding the plant described by Mr. Young, there is a further omission in the paper. He does not tell his readers whether, if he were starting *de novo* in this matter, the type of plant and the methods of operation so tersely and well described are those that he would adopt and pursue. That there would be certain changes, in the event of a replacement or extension of plant, is evident in at least a couple of places in the description. But those who are tar distillers, and have an intimate acquaintance with plant and methods, will pass judgment on the descriptive part of the paper according to their individual fancies and practices, and such judgment will not in all respects be favourable, in respect of details, to the Hull plant and methods. But it must be remembered that Mr. Young inherited this plant. It does not therefore necessarily represent the plant that he would put down were it at the present time permissible. It does not always pay to demolish, or to start modernizing in part; but change there will no doubt be in several details when free reconstruction is permitted, or any extension is required. The plant has done well in the past; and, under Mr. Young's supervision, it is doing well in the present. But possibly he, better than anyone else, can put his finger on places where improvement could be shown.

## Coal and Coke—Labour and Trade.

THOSE who are interested in studying the country's industrial affairs have before them just now an interesting combination of circumstances illustrating the interdependence of industry. The protracted engineering strike has ended almost simultaneously with the beginning of the great cotton lock-out. Leaving out of consideration the lamentable injury to individuals and homes, the disturbance in the Northern engineering trade has worked untold mischief to not only the industry directly affected, but to numerous others, and much work which might have been kept at home has gone irretrievably to foreign countries. The effect of this will be felt for some time to come, though, as the trade returns prove, we can as a country ill-afford such losses. Should the closing of the cotton mills be of long duration, several dependent textile industries will suffer; and, among outside industries, those of gas and coal. Under such circumstance, there would, of course, be a not inconsiderable diminution in the consumption of gas for lighting and power purposes for those gas undertakings whose operations are centred in the textile districts; and there will be little satisfaction to those who will be losing the profit on this consumption to know that, bound by the coal contracts they have now running, they will not be in a position to purchase coal at the lower prices that are certain to ensue, if there are to be some weeks' idleness of the mills. Dealers on the large scale in coal, we know, have been looking anxiously, during the recent period of a general ebb in demand, for the issue of the negotiations that have been pending between the employers and employed in the cotton industry; and there will now, if there is not an immediate change, be a considerable amount of coal waiting for absorption in some other directions. In addition to direct information on this head, we see that one of our coal contemporaries predicts that, if there is protracted idleness in the cotton trade, many collieries will be affected somewhat seriously. The coal market has already evinced signs of further weakening; and this applies to gas coals as well as to other varieties. It is only the collieries that have big contracts running that can now afford to maintain quotations. In the Durham district, business is being

readily done at below prices that have been quite recently published; and there is an abundance of Yorkshire coal to be had. It is palpable that the gas undertakings that did not fill their requirements when the colliery owners were more or less "sitting tight" at an inadequate reduction of last year's prices, are in a better position to-day to make their own choice, and to work the competition for orders to greater advantage than they were able to do but a few months since. The engineering strike and cotton lock-out have done much to weaken the position of the coal owners; and a great deal depends on the lock-out as to how their position will be shaped this winter. Regarding these two particular labour disturbances, there are several lessons to be extracted from them by all who are interested in labour; but they cannot appropriately be introduced here, excepting to point out that they are showing the power of employers when acting in concert, and how weak-kneed are schemes of conciliation when the parties are resolute, and believe in the justice—although one of them be misguided into the belief—of their respective causes.

Among the industries that are extremely sensitive to the vacillations of general trade, and one that affords another excellent illustration of the interdependence of industries, is that of cement manufacture, which is one of the gas industry's best customers for coke. Particularly interesting was the statement of Mr. F. A. White, the Chairman of the Portland Cement Manufacturers (1900), Limited, at the meeting of the shareholders last Friday. Those who have coke dealings with the cement trade will regard as ominous for the immediate future the declaration that the state of the building trade to-day is worse than it has been for 35 years; and the cement industry is in consequence suffering in company with all others that minister to building work. There has of late been a sensible diminution in the price paid for coke by the cement trade; but the cement manufacturers cannot, of course, expect it to go much lower in view of the inordinate high prices of coal under such conditions as those now prevailing. Mr. White, in the philosophic vein that ran through his speech, pointed to the fact that no amount of lowering of the price of cement would attract orders that did not exist; and, applying the same reasoning to coke, no amount of lowering of price will tempt the cement makers to buy any more fuel than they require, or are under obligation to accept in terms of their contracts. But while things look black in the direction of the building trade, there is a brighter view in the growing favour of reinforced concrete construction, which therefore bids fair to increase considerably the demand for cement. This, in turn, should bring benefit to the coke market. There are proposals afloat for the amendment of the bye-laws under the London Building Acts which have been a hindrance to the development of reinforced concrete construction, but which amendment would give relief. The extended employment of this method of construction is also seen in work by Government departments, railway, harbour, dock, and municipal authorities. So much the better for the cement industry, and for the industries from whom its supplies—fuel, for instance—are drawn.

## Sir George Livesey.

Reports were in circulation last week that Sir George Livesey was seriously ill; but we are happily in a position to say there is no immediate cause for alarm among his multitude of friends. Sir George is ill, is very weak, and is, of course, confined to his room; and his medical adviser suggests for him, when fortunately he is able to leave home again, an absolute rest for some few weeks in which to convalesce before resuming active participation in the numerous interests that have been engaging his attention. From this it will be gathered that, while illness at the age of 74 must cause anxiety to friends, there is no ground for extreme apprehension; but the greater the repose of the patient, the better. In the activity and energy that Sir George still displays when health permits, the age he has attained to is largely forgotten. It has been a lifelong characteristic for him to put heart and soul into all work to which he has laid hand; and we are afraid his enthusiasm in professional, industrial, and humane cause has often induced him to yield, in late years, to friendly requests when, in the preservation of health, it would have been far better to have declined. There is his advocacy of co-partnership. We have seen what he has recently done publicly in this cause—before the Institution of Gas Engineers, the Southern Gas Association, and at the Pan-Anglican Conference; but behind public performance the detailed work—thoroughness has been of his very nature—has had large share in his thoughts. By sympathy and personal act, too, he has exerted himself in overcoming the difficulties of his men in striving to reach the high ideal which he has set for them; and no one can speak so well as the men themselves of his tender solicitation in this regard. Then of recent times, too, in addition to his work as Chairman of the South Metropolitan and South Suburban Gas Companies, he has taken upon himself the duties of President of the Society of British Gas Industries. The Port of London Bill and the Coal Mines (Eight Hours) Bill have also drawn considerably on his time, energy, and thought. The desire is a universal one in the gas industry that we should have the benefit of his watchfulness and advice for several years to come; but any continuance of such self-sacrificing activity as there has been of recent years must, we are afraid, conduce to disappointment. In speaking with a directness that would not be admissible in the case of all men, there are behind the words the deep-seated feelings of many friends, with whom we look trustfully for a rapid re-establishment in health.

## Derelict Foreign Patents.

It's an ill wind that blows nobody good. It is reported that a new Company, with large financial resources, is about to be formed, on the initiative of several influential firms, with the object, among others, of opening works for the production of articles patented in this country by foreign inventors who have failed to avail themselves of the period of grace allowed by the Patents and Designs Act of 1907, for commencing, or making arrangements, to manufacture their inventions in this country. The mistake must not be made that the unworked foreign patents of four years' age can be legally picked up and appropriated with unrestricted freedom. The new Act is not so harsh in operation as that. Manufacture cannot be legally commenced until certain formalities are complied with, and the patent authoritatively revoked; and after revocation there can be no monopoly in these derelict inventions by any one firm. Human nature bulks largely in the propositions of the new Company; and they are apparently intending to look well after themselves. Not only are large new works for the materializing of the products of other peoples' brains part of the scheme, but they are proposing to act as a sort of protection society, by finding out for the good of the country generally, and for themselves in particular (the last few words should be italicized, so as to emphasize them), what patents have expired, or what arrangements foreign firms have made with some English house to manufacture their patented articles. Whatever is done in this matter of working the inventions of foreign patentees, it is hoped it will all be above board, and that there will be no such thing as secret appropriation before proper revocation is secured. This country is now in a strong position in the matter. The strong can afford to be charitable and not oppressive, and to do everything squarely and fairly.

## Wandsworth Gas Company and the Rehousing Question.

The liability of railway and other companies to provide accommodation for persons displaced in the carrying out of schemes for the enlargement or improvement of their works, has long been recognized; and clauses bearing upon the matter are usually to be found in the Acts of Parliament sanctioning these schemes. By their Act of 1900, the Wandsworth and Putney Gas Company laid themselves under this obligation; and they have already rehoused certain parties who were interfered with. It has lately been decided to carry out the second portion of their scheme, which will necessitate the demolition of six houses. The Act specifies that they are not to do this until they have provided such additional number of new dwellings as the Local Government Board may deem necessary, unless the Board decide that a housing scheme in respect thereof is not called for. In view of the large number of unoccupied houses—something like 4000—in the borough of Wandsworth, and of the fact that there are about half this number in Battersea and a great many across the river in Fulham, the Company submitted to the Board that no housing scheme was needed; and the Board sent one of their Inspectors to hold a public inquiry into the matter. A report of the proceedings will be found elsewhere; and we think it will be found therefrom that the Company have made out a good case.

They have no desire to shirk their responsibilities. Indeed, they have put up houses which have been thoroughly satisfactory; and it was shrewdly suggested by the Secretary (Mr. C. W. Braine), in the course of the inquiry, that the opposition of the Borough Council was prompted by their desire to have a few more. But why should the Company build them, when there is ample accommodation near at hand for all the people to be displaced? We say "ample;" but the Inspector is reported to have said that it seemed to him that houses could be found for them "three or four times over." Several members of the Council were present at the inquiry, and expressed the opinion that no housing scheme was necessary. Though the Public Health Committee had passed a resolution to the contrary effect, one of the members who voted for it confessed that the evidence adduced at the inquiry had led him to alter his views entirely. He expressed the opinion that if the six houses in question had to be demolished, "there was not the slightest necessity for the Gas Company to build others in their place." It would, of course, be useless to speculate as to what will be the nature of the report of the Inspector; but, in view of the facts submitted to him, we scarcely think it will be unfavourable to the Company.

## Accountants in Conference.

Various subjects of interest to the profession were discussed at the autumn conference of the Society of Accountants and Auditors which was held last week at Cardiff; the proposed reforms in the Bankruptcy Law being first reviewed at length by the President (Mr. H. Lloyd Price) in the course of his opening address. Thereafter Mr. G. S. Pitt dealt with the accounts of trading concerns and their audit. Great advantage, he said, had resulted from the adoption of standard forms of published accounts; and he believed one of the chief reasons for the commercial success of our forefathers was that their finances were sounder—due to the fact that successful merchants only spent a small proportion of their profits, and left in the remainder to strengthen their business. In his opinion this was the first essential to commercial success; and in abandoning it the limited liability companies of to-day had committed the most fatal error. The Governments of France, Germany, Belgium, and Italy had set us a good example by making reserve funds compulsory for such undertakings. Again, every balance-sheet should disclose the liquid assets, added up in total on the one side, and cash liabilities added up in total on the other side. Mr. Pitt's suggestions regarding the standardization of accounts were as follows: That in view of the immense diversity in the nature of commercial undertakings, a general standardization of published forms of accounts is impracticable. That in particular cases—such as railway, electric and gas lighting, water, tramways, hospital accounts, &c.—the advantages of standardization are clearly established; but even in these cases reconsideration and revision are constantly necessary. That all published accounts, with the exception of those already regulated by Act of Parliament, should be drawn up subject to certain rules. That a general council of professional accountants should be established to advise the Government as to the framing of these rules, as to their revision from time to time, and on other accountancy matters. Cardiff's own contribution to the proceedings was a very useful paper by Mr. John Allcock, the City Treasurer, on "Local Taxation and Municipal Accounts," in the course of which he urged the importance of municipalities laying aside a sum for depreciation of industrial enterprises, failing the calculation by the Local Government Board of sinking funds on the life of the component parts of an undertaking. We are pleased to note that the author does not altogether favour the relief of rates by means of profits secured on municipal concerns. While thinking there might be much to advance in favour of it, he pointed out that the transfer of the profits brought about a dislocation as between ratepayers and the gas and electricity consumers, &c. If they were not so transferred, the commodity could be supplied at a less price. "Why," for instance, he asked, "should a manufacturer using an enormous quantity of gas pay a higher price in order that profits might be transferred in aid of rates?" How many others have asked the same question! Dealing with the usual answer to the question—that the general ratepayers' credit had been pledged to find the necessary capital—Mr. Allcock urged that, while there might be something to be said for this view, he was inclined to believe that the measure of the advantage in using the credit of the ratepayers was less than that represented by the profits transferred; and the applause of his auditors showed that many of them agreed with him.

## Elective Auditing at Manchester.

Certainly Mr. S. Norbury Williams, in his capacity as an Elective Auditor at Manchester, displays an activity which it would be difficult to surpass. But, as he remarks, he does not find the citizens so ready as he would like them to be to follow him. Perhaps this is owing to the proverbial lethargy of the ratepayer in regard to matters which affect his interests; or perhaps, again, it may be explained by the fact that those to whom Mr. Norbury Williams appeals do not look upon the matters to which he calls attention in the same serious light as he himself does. Whatever may be the cause, however, his success is small, as witness the following, which is taken from his latest manifesto: "I know the number of our citizens; it stands to-day at 107,000. But when I ask how many of them are full of public spirit—how many will fight day and night to get wrongs righted, scandals exposed, or extravagance stopped, I am so appalled and ashamed of the small number to be found in this vast population of ours, that I dare not put that small number on paper." For fifteen years he has been an Elective Auditor; and during this time there have probably been few occasions (when the opportunity has presented itself) on which he has failed to draw attention to what he terms "gross extravagance in the Council's feastings." Once he got so far as to propose the bringing of an action to put an end to "costly banquets and luncheons," which he said could be carried through for £90. A Ratepayers' Association was formed, and something under £35 was subscribed; but then the new organization carried a resolution to the effect that the proposed test case be abandoned. In view of this, and making all due allowance for the before-mentioned lethargy of the ratepayer, it does really seem that the citizens must have made up their minds that there is very little, or nothing at all, to seriously complain of in the conduct of the City Councillors. They mildly grumble, perhaps, as they do at the weather; but they apparently do not regard the matter as worth further troubling themselves about. One of Mr. Norbury Williams's latest grievances is the spending of £70 over the dinner which took place last July on the occasion of the laying of the foundation stone of the large new holder at the Bradford Road Station. This, however, was a noteworthy occasion—seeing the holder will be the largest so far erected in the Provinces—and as such it was duly celebrated. A numerous company were invited to attend the ceremony; and naturally they were not sent empty away. Other instances are cited by Mr. Norbury Williams; but as the citizens themselves do not seemingly take them seriously, there does not appear to be any reason why anyone else should do so. The "manifesto" here referred to is, it may be remarked, issued in view of the polling for Elective Auditors for the coming year, which takes place this week. There are three candidates for two places; but ratepayers can only vote for one of them. Probably Mr. Norbury Williams will accept his election for the sixteenth year (if he be so chosen) as at any rate some sort of endorsement by the citizens of his policy,

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The Eastern District Section of the Scottish Junior Gas Association will hold their fifth annual meeting in the Heriot-Watt College, Edinburgh, on the afternoon of Saturday, the 10th prox., when the new President—Mr. A. Morton Fyffe, of Dundee—will deliver his Inaugural Address.

We regret to announce that after a short illness, Mr. Charles William Davis, one of the Managing-Directors of the Davis Gas-Stove Company, Limited, died at his residence, "The Firs," Claygate, Surrey, on Saturday morning last, in his 66th year. Mr. Charles Davis and his brother, Mr. Henry John Davis, the present Chairman of the Company, together with his cousin, Mr. Henry Addis Price, were the original founders of the business, in which, almost up to the time of his death, he took an active part.

It may be remembered that on the occasion of the last meeting of the Association of Water Engineers, held in Birmingham in June, a description of the Elan Valley supply works of the Corporation was given by the Secretary of the Water Department (Mr. E. Antony Lees); and it appeared in the report of the proceedings published in the "JOURNAL" at the time. The paper has now been reproduced in book form—accompanied by eight photographs and four folding plates—published by Messrs. Cornish Bros., Limited, of New Street, Birmingham, price 1s. net. In view of the magnitude of the water scheme, the Corporation did well to enable citizens to familiarize themselves with its details, which they can do by the purchase of the artistically got-up book in which Messrs. Cornish present them.

## GAS STOCK AND SHARE MARKET.

**(For Stock and Share List, see p. 876.)**

THE course of markets on the Stock Exchange last week, despite occasional oscillations, had a good balance of advantage at the close. Favourable factors were the abundant cheapness of money and a brighter view taken of the aspect of home affairs. These influenced a fairly good demand for Consols and other gilt-edged securities for investment, imparted strength to drooping Home Rails, and effected a considerable recovery in the brewery trade. A malign element was the American Market. Gas securities fully participated in the upward movement; and though one or two issues eased fractionally, there were *per contra* a large number of advances among the quotations of others. The opening was not promising, and most lines were languid and dull; Government securities notably showing weakness. On Tuesday, the tone was better. Consols and the gilt-edged section were firmer, and Railways steadied. Wednesday was a quiet day, and the tone was shifty. High-class securities were in good odour, Consols were steady, and there was a calmer tendency in the feverish American Market. Gas was in good demand, and further rises in value appeared. On Thursday, the tendency pretty well all round was better, and many lines had some improvement. Friday was about the firmest day of the week—an unusual phenomenon. Prices looked up brightly in response to buyers' requirements; but Gaslight ordinary was a fraction easier. On Saturday, the general cheerfulness was well maintained. Consols had a further rise, and choice issues were again in demand. The condition of the Money Market was unchanged, and easy rates for short loans continued pertinaciously. Discount, too, after standing steady for some days, gave way at the end. Business in the Gas Market was rather quieter than the week before. Several issues made improvements upon their old quotations; but Alliance and Dublin gave way in view of the dividend encroaching rather freely on the reserve fund. In Gaslight and Coke, the ordinary was a trifle easier, and changed hands at from 99 to 99¾. In the secured issues, the maximum realized 88¾, the preference from 105½ to 107 (a rise of ½), and the debenture 86 to 86½. South Metropolitan was quiet and steady, with business done at from 120¾ to 122. The debenture fetched 85. Commercials were quite neglected. In the Suburban and Provincial group, Alliance and Dublin changed hands at 19¾ and 19⅝, British was active at from 42⅜ to 42⅝, South Suburban marked 117½, Tottenham "B" was done more than once at 106½, and West Ham at 101 to 102. The Continental companies were a quiet lot. Imperial was done at from 181 free to 182¼, Union at 108⅜ and 108¼, and European fully-paid at 23⅝ (a rise of ¼). Among the undertakings of the remoter world, Bombay changed hands at 6 1/32, Buenos Ayres at 11⅛ special and 11⅝, Monte Video at 12 (a rise of ½), Primitiva at 6 1/16, ditto preference at 5⅛, River Plate at 13⅝ and 13 9/16, and San Paulo at 14 (a rise of ¼).

## ELECTRICITY SUPPLY MEMORANDA.

### Perfidious Electricity and the Reliable Gas-Lamp—An Illegal Proposal—A Cheap Dinner—The Plaint of the Lamp Retailer—Dissatisfaction in Dublin—A Disastrous Short-Circuit.

IT was not a great while ago that one of our much-esteemed electrical contemporaries soundly rated those associated with a provincial electricity undertaking for the repeated collapses in the supply to which their customers were subjected, and suggested that these uncomfortable mishaps could be averted if only proper attention was given to the plant. But there are some things in this world that are easier talked about than achieved; and time, which is supposed to be the healer of all things, does not produce that confidence in the constancy of electricity supply that is desirable for the attainment of the highest commercial advantage. Take only the last two issues of the "JOURNAL." Mention was made in them of serious disturbances of the electricity supply in Geneva, in the South Metropolitan Electric Supply Company's area, at Southend, and at Felixstowe. Such occurrences cannot fail to bring discredit upon the electricity business, and prevent people giving up that which has proved its reliability for that which at any moment may pitch them into absolute darkness. Those who suffer, besides bemoaning their fate, do not forget to advertise their grievances, and look around to see how best to protect themselves. The account which a correspondent sent us last week of the failure at Geneva (p. 800), we hear was not a whit overdrawn. There was one particularly interesting feature about it; and that was the fact as to arc lamp standards being fitted with incandescent gas-lamps, which came in so useful when the electric current failed. Incandescent gas-lamps in such a position are the permanent brand of the unreliability of the arc lamps, and are an excellent advertisement for gas. The idea is one which might well be imitated by some of our local authorities who have expended large sums of the ratepayers' money on electricity. For example, how much better things would have been in the electricity-lit streets of those towns that have been suffering from these collapses, if immediate recourse could have been had to gas-lamps; and how much better off were those streets from which the gas-lamps had not been removed. There is a great responsibility resting upon the local authorities in this matter. We notice that several of the important establishments in London in which electricity has been adopted, still cling to their gas-fittings as a stand-by; and we have remarked that certain popular places for the refreshment of the inner man have recently had their incandescent gas-fittings overhauled, and equipped with mantles ready for emergencies. Their managers are wise; Paris has induced them to take this step.

It comes almost as a surprise to learn that anything is illegal in connection with electricity supply tariffs. Only last week we were discussing certain tariff proposals, and, among other points, referred to the suggestion of Mr. E. E. Hoadley for having fixed charges for consumers' lamps, instead of metering. The same question has been raised at Harrogate, on a proposal by the Electric Lighting Committee, which was warmly supported by Mr. George Wilkinson, the Borough Electrical Engineer, that an experiment with twenty existing customers and twenty new ones should be made, charging 2s. 9d. per quarter per 30-watt lamp, subject to the amounts being paid quarterly in advance. All apartments fitted with light under this tariff are to be adequately lighted by windows during the day; and the minimum number of lamps per tenement is to be three. The proposition was declared by the Town Clerk to be illegal; and the Mayor took it upon himself to see that the recommendation was not carried out, although the Council passed it in face of the Town Clerk's ruling. Nevertheless, the proposition is interesting, in view of Mr. Wilkinson's assertion that he was certain it would pay. But all the members of the Council were not of his way of thinking. An electrical tariff that is as free from conditions as the sale and purchase of an ordinary article of daily consumption would be a novelty. Even in this one, which is intended to catch the least moneyed class of a community, there are certain conditions which would be obstructive to its adoption. In the first place, the amounts are to be paid quarterly in advance. Now, electricians may be advised not to anticipate any large business if they are going to demand lump sums from working men. As a rule, the earnings of the artisan compel him, if he is honest, to pay as he goes. He abhors running up accounts, especially for purchases which have no tangibility, such as light. Then who is to be the arbiter as to whether a place is "adequately lighted by windows?" Workmen's kitchens, which are generally the daily living-rooms for the family, are not always blessed with an over-abundance of light; and the characteristic of human nature to take liberal advantage of opportunity when there is nothing standing on guard would, we think, soon show that the 2s. 9d. for a 30-watt lamp would not pay. In thirteen weeks there are 91 days. Taking six hours a day as the average use of such a lamp at this time of the year, we have 546 hours at 30 watts, which equal about 16½ units, for which 2s. 9d. would be paid! A 30-watt lamp, of the metallic filament type, would have an illuminating power of only 24 candles; and this would be a poor light for a living-room. Such a scheme would, we think, soon work its own destruction.

While the diversity of opinion among individuals in relation to tariffs resists the settling down of this much-debated question on a common-sense basis, electricians seem to overlook the fact that they may become the most admired of wonder-workers by scattering broadcast in their districts the General Electric Company's cooking outfit. Householders grumble at the cost of living and the financial burdens of the times. We read in the Daily Press of the "hunger marchers;" we hear the sad words reverberating through the ravines of time, "Let the hungry be fed," and comply with skinflint meanness. Yet there is offered to us a means of doing this at unprecedented cost. We do not know how it is done, excepting that it is through some esoteric property of electricity. But the fact remains—any way, it stands as a prominent announcement in the General Electric Company's advertisement—that, "with electricity for cooking at 1d. per unit, a dinner for eight persons costs 4¾d." That is the statement made in black and white; and the poorest among us will now be able to entertain his friends lavishly. "A dinner for eight persons costs 4¾d.!" The statement is quite plain and definite. The only requisites are electricity for the cooking of the dinner, at the price of 1d. per unit, and a complete cooking outfit, with plugs, switches, and armoured flexible leads, for £18 10s. This is the only doubtful point. Even with the prospect of getting dinners for eight persons at 4¾d. a time, a good many householders will have some difficulty in scraping together the £18 10s., unless, of course, electricity suppliers (who by repute are great philanthropists) do the handsome thing, and fix these outfits in the houses in the length and breadth of their districts. Gas can cook a dinner for eight persons for much less than 4¾d. for fuel; but gas people are compelled to stop short at announcing that a dinner for eight persons only costs 4¾d. That is beyond them; but they can supply several commodious cooking outfits for the sum of £18 10s. It is also observed that the General Electric Company's advertisement announces "Large Stocks Held." We are not surprised.

Bitter have been the complaints that are being made by electric lamp retailers in the "Correspondence" columns of one of our electrical contemporaries. The metallic filament lamps are at the bottom of the trouble; the allegation being that, taking into consideration breakages, failure, &c., the retail trade is absolutely unprofitable. The contractor makes, through these breakages and failures, a dead loss on the business; and the lamp manufacturer refuses to replace the lamps or make any allowance. This is hard on the contractor; but the latter who makes a continuous loss on a line of business in this way richly earns a title which absorbs in

its construction only four letters of the alphabet. The retailers cannot charge more; for 4s. for the Osram and other metallic lamps is not found to be a popular price. A "progressive policy" is being urged on the lamp manufacturers, with a price per lamp not exceeding 2s. Of course, "progressive" policies may take diametrically opposite directions; and the manufacturers have no desire to adopt a policy that would, as the one proposed at present would do, bring them a progressive loss. As Mr. H. Hirst, of the General Electric Company, was telling us earlier in the year, these metallic filament lamps are relatively expensive things to produce. They require an extraordinary amount of care in their manufacture; and they and their development have cost a large sum of money. It is altogether a confused position, from which the partners in the electrical industry appear incapable of extricating themselves. The metallic filament lamps are very costly to make; and the makers intend getting their fair profit on them. Knowing the brittleness of the filaments when cold, and their aversion to maintaining their integrity when undergoing transmission, the manufacturers decline to do anything more than bear the minimum risk, believing that charity begins at home. The contractors and retailers who purchase have to take the maximum risk in connection with collapses by the way. They avow that money is lost by them. The central station engineer who professes with his lips that he heartily welcomes these lamps, knows in his heart that they mean reduced business per consumer, and that the reduction can only be recovered with a lower margin of profit on the capital expenditure per consumer.

It is to be hoped that at length the true position of the Dublin Corporation electricity supply undertaking is to be divulged. Unanimously the Council have passed a resolution instructing the City Treasurer and the City Accountant to inquire into, and report upon, the general financial position of the whole concern. There appears to be common discontent with the position and management of the department. It has been a heavy burden upon the ratepayers, in a direct manner that they could well understand. For the past two or three years, it has been shown on the face of the accounts that the undertaking pays its own way. It is to be hoped the inquiry will not be superficial, but that it will go well into the heart of affairs, and make it clear to the ratepayers how much they are contributing indirectly to the support of the department through an expensive system of public lighting, and show them whether the undertaking, as a municipal department, bears fully and fairly the whole of the charges that should be made against it as a trading venture, that there are not any that are surreptitiously charged to some other department, and that the concern is properly rated on the lines applied to privately-owned business concerns in the city. There is, no doubt, much enlightenment to be gained by a thorough investigation. The dissatisfaction that exists with this heavily capitalized concern was remarked upon in our editorial columns recently, when it was also mentioned that an idea prevailed in more than one mind that the only way to put the electricity supply undertaking on a sound financial basis would be by the expropriation of the Gas Company, so that the Corporation could direct the competition in their own way, and make the ratepayers suffer further in consequence. The idea was trotted out again at the meeting at which the resolution as to investigation was passed. But the acquisition of the Gas Company's property would be rather a big thing for even the Dublin Corporation to handle; and they have enough to do at the present time to serve properly the interests of the ratepayers.

The great fire at the Paris telephone bureau, which caused such considerable damage, estimated at £500,000, was due, it has been officially announced, to a short-circuit in the wires situated in the basement. Our only interest in the matter is that it points once again to the danger of short-circuits occurring in positions which are not easily accessible, or where they cannot be readily detected; and, further, it shows that the insulation of wires affords, as in this case, an active transmission of fire to all parts of a building.

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**"Technical Methods of Chemical Analysis."**—We have received from Messrs. Gurney and Jackson, of Paternoster Row, E.C., Vol. I. of an important work bearing the above title which will be published by them to-morrow. It is an English translation from the latest German edition of an earlier book by Dr. F. Böckmann, which was brought out four years ago under the editorship of Dr. Lunge, Emeritus Professor of Technical Chemistry in the Federal Polytechnic School, Zurich, in collaboration with a number of technicians; and it is edited by Dr. C. A. Keane, Principal and Head of the Chemistry Department in the Sir John Cass Technical Institute, London, in association with a couple of dozen specialists, among whom is Dr. Harold G. Colman. The plan of the book consists in the treatment, in separate sections, of the technical methods of analysis applicable to specific industries. The chief methods are given in all cases; but full details are described only for those which have proved good and reliable in the hands of the writers of the various sections, or which are otherwise recognized as efficient. A general introduction on analytical methods is included in Vol. I., in which the more common operations and apparatus are dealt with. A useful feature of the book is that all important tables, in addition to being printed in the text, are also reproduced for reference at the end of each volume. The first volume, which is in two parts, consists of 1024 pages medium 8vo. (9½ in. by 6¼ in.); and the price is £2 12s. 6d. net. The book will be more fully noticed in an early number of the "JOURNAL."

## GAS ACTS FOR 1908.

[SECOND ARTICLE.]

THIS week the Gas Acts of the session promoted by statutory gas undertakings are brought under review.

The first one, in alphabetical order, is the Bromley and Crays Act, by which there has been fusion of the Crays Company with the larger undertaking. Subject to the new Act, the provisions of the Bromley Acts as to illuminating power, purity, pressure, and testing of the gas, and the standard rates of dividend, are made to apply to the whole area, and all necessary powers in the Crays Acts are vested in the amalgamated Company. Provision is made for the creation and issue to holders of Crays stock of an amount of "C" stock equal to the consolidated ordinary stock subsisting at the date of the amalgamation. This "C" stock is entitled to a standard dividend of 5 per cent.; and, subject to increase or decrease of dividend as specified in the Act, the stock is to carry the same rights and privileges as the "A" ordinary stock, including the provisions of section 30 of the Bromley Act of 1902 as to proportionate reduction of dividend. The standard price of gas is to be 4s. 6d.; and the sliding-scale is to operate half yearly—penny variations in price increasing or decreasing, as the case may be, the dividend on the "A" and "B" stock by 1s. 3d. per cent. In respect of any half year in which the price charged is above the standard price, the dividend declared on the "C" stock is to be at the same rate as that declared on the "A" ordinary stock; but in respect of any half year during the whole of which the price charged shall have been below the standard price, the dividend declared on the "C" stock is to be at the rate of 5s. per cent. less than the dividend on the "A" stock—provided that the dividend on the "C" stock is not reduced at any time below 5 per cent. per annum so long as the dividend declared on the "A" stock is at or above the rate of 5 per cent. Regarding the price of gas. For five years in the Crays district it is not to be more than 6d. nor less than 4d. in excess of the Bromley price; for the succeeding five years, not more than 4d. nor less than 3d. in excess; and thereafter—that is to say on June 24, 1918—the price is to be the same as in Bromley. But the price in the Crays district is not to exceed 4s. 6d., so long as the Bromley price is below that figure; so long as the Bromley price is 4s. 6d. or upwards, the price in the Crays district is to be the same as the Bromley price; and so long as the price in the Crays district is more than 3d. in excess of the Bromley price, the amalgamated Company are not to pay a higher dividend per annum than 6 per cent. on the "A" stock, 4½ per cent. on the "B" stock, and 5½ per cent. on the "C" stock. The unexercised additional capital powers authorized by the Crays 1897 Act are transferred; it being permissible to raise the capital as "A" or "B" stock, or preference stock. Sub-section 3 of section 13 of the Bromley Act of 1902, referring to the sale of stock, is amended by the omission of the words "the reserved price put upon such stock shall not be less than the nominal amount thereof." The additional borrowing powers granted comprise (including the existing debenture stock of the Crays Company) one-third part of the amount on the "C" stock and of the sum obtained by the Crays Company as premiums on the issue of stock, and one-third on the additional capital authorized by the Act. Provision is made for insurance and reserve funds; and the usual clause as to excess profits is extended by the carry-forward being limited in amount to the equivalent of a year's dividends. Respecting the directorate, three of the Crays Directors join the Board of the amalgamated Company; but the first three vacancies are not to be filled up—thus reducing the number of members to seven, as formerly on the Bromley Board. The retiring Crays Director receives as compensation a sum equivalent to seven years of his remuneration as Director, calculated upon the average of the three years previous to the amalgamation. Each of the Auditors is to receive a sum equivalent to two years' remuneration. Mr. W. B. Mimmack, the Secretary of the Company, on his discontinuing office, is to receive a retiring allowance of £300 a year. Any other officers whose services are dispensed with in consequence of the amalgamation are each to receive an amount equivalent to his year's salary and the agreed emoluments of the office. The Bromley standard of illuminating power—14 candles—is to be continued; and the modern testing clauses are to apply. There is to be continuation of the testing-place at the gas-works at St. Paul's Cray. The Company have obtained authority to supply "power gas," which is to be exempt from the provisions of the Company's Acts as to illuminating power, purity, &c. This gas is not to be supplied for illuminating purposes; and it is to possess a distinctive and readily perceptible smell. The authorization conferred in respect of power gas is to be subject to any regulations hereafter made by the Home Secretary, or to any General Acts that may come into force. There were two clauses in the Bill that are not found in the Act. The one referred to the half-candle margin in illuminating power in connection with penalty testing; and the other to the declaration that the placing of moneys in a prepayment meter by a consumer should not discharge him from his obligation as to payment in the event of the money being subsequently lost. [*Parliamentary Agents: Messrs. Rees and Freres.*]

By the Dartford Gas Act, the Company are authorized to take additional lands for new works. The capital is to be converted and consolidated on a 5 per cent. basis; and additional capital is authorized to the amount of £75,000. The new auction clauses

are applied to its issue. Including £18,500 authorized to be borrowed in pursuance of the Act of 1880, the Company are empowered to borrow one-third of the nominal amount of the consolidated stock and one-third of the issued additional capital. The standard illuminating power of gas is to be 14 candles, tested by the "Metropolitan" No. 2 burner, and Harcourt's 10-candle pentane lamp. The model prepayment clauses are included. The provision made in the Bill for renewal, insurance, and reserve funds has disappeared; and the special purposes fund has not been inserted in their stead. [*Parliamentary Agents: Messrs. Sherwood and Co.*]

By their new Act, the Derby Gas Company secure the extension of their limits, so as to include Belper, Milford, Holbrook, Coxbench, and Hilton, and portions of Kilbourne, Denby, and Heage. The agreements with the Belper Gas Company and Mr. G. H. Strutt, for the acquisition of their gas undertakings (the principal terms of which were set out when noticing the Bill on Jan. 14 last, p. 87) have been ratified; and authorization is given for the creation of the necessary amount of stock to carry out the agreements. The Act also authorizes the Company and the Corporation of Derby to enter into an agreement with respect to the building of a coal-conveyor or similar structure across Ford Street for the purpose of giving access between the existing gas-works and the railway of the Great Northern Company (Derbyshire and Staffordshire lines) adjoining the street in question. The Act is practically a reprint of the Bill; the only alterations being those occasioned by the changes in state from Bill to Act. [*Parliamentary Agents: Messrs. Dyson and Co.*]

The Draycott Gas Act is the outcome of the most interesting contest in the Committee rooms of the session; and it effectually wipes out all territorial difficulties that existed between them and the Long Eaton Gas Company, and gives precise definition to their respective frontiers in the area in question. The Long Eaton Gas Company are to clear out of a defined district of which they had taken possession; and within three months of the passing of the Act, are to take up and remove the mains, pipes, and apparatus belonging to them in that area. The Draycott Company are to pay to the Long Eaton Company the actual expense incurred by the removal of the mains, pipes, and apparatus lying between Risley Lane and the railway bridge of the Midland Company situated at Draycott station. If the sum to be paid cannot be agreed, it is to be referred to arbitration. The Long Eaton Company are to be at liberty, for the purpose only of affording a supply of gas to that part of their area of supply lying to the north of the Draycott Company's area, to retain and repair and renew and continue to use the main already laid by them for that purpose in Hilsthorpe Lane and Risley Lane. The limits of the Draycott Gas Company are also extended by the Act to embrace Shardlow and Great Wilne, a portion of Draycott lying south of the River Derwent, Castle Donington, Hemington, and Lockington. The private gas supply of Offiler's Brewery, Limited, at Cavendish Bridge, and the sale of gas to their tenants or occupiers of property belonging to them, are the subject of protection. Confirmation is granted to the purchase of the Castle Donington Gas Company's undertaking on agreed terms. Manufacturing and storage powers are given in respect of scheduled lands. The consolidation and conversion of the Company's capital on a 5 per cent. basis is agreed to; and an additional £50,000 of capital is authorized, subject to the new auction clauses. The Company sought power to borrow one-third part of the preference capital and one-third of the nominal amount of stock into which the ordinary capital is to be converted, and one-third on the additional capital. This proposal has been altered to one-third part of the existing original capital of £10,000 and one-third part of the preference capital raised in pursuance of the Act of 1888, with one-third on the additional capital. The standard prices for gas are to be, within a radius of 1250 yards from the centre of the gas-works at Draycott, 4s. 6d., and to consumers in all other portions of the limits of supply, 5s. The provisions of the sliding-scale are altered to comply with the converted capital—that is to say, the variation of dividend will now be on penny changes in price at the rate of 2s. 6d. per cent. The discounts clause in the Act of 1888 is repealed. A renewals fund is allowed. The standard of illuminating power is prescribed at 14 candles, tested by the "Metropolitan" No. 2 burner and the Harcourt 10-candle pentane lamp.—[*Parliamentary Agents: Messrs. Crowders, Vizard, Oldham, and Co.*]

The Garw and Ogmore Gas Act extends the Company's limits of supply to include as much of the area of the District Council as is not already within the Company's statutory limits, and that part of the district of the Penybont Rural District Council as lies to the east of the Llynfi river and north of the Ogmore river. The Company have obtained power regarding scheduled lands on which to continue their gas-works at Pontycymmer, and some additional lands for manufacturing and storage purposes. The additional capital sought was £40,000. It has been reduced to £30,000. An unusual provision appears regarding two rates of dividend on the additional ordinary capital. On the original capital, the standard dividend is to be at the rate of 10 per cent., on £20,000 of the additional capital 7 per cent., and 5 per cent. on the balance of £10,000 whether issued as ordinary or preference capital. Issues are subject to the new auction clauses. The borrowing powers are the ordinary one-third. The new special purposes fund appears. It was proposed in the Bill that the standard illuminating power should be 12 candles, tested by the "Metropolitan" No. 2 burner and Harcourt's 10-candle pentane lamp. Now the 12 candles has been substituted by 14 candles; and the price is not at any time to exceed 4s. 6d. per 1000 cubic feet. Purchase clauses are inserted in favour of the Ogmore and Garw District Council and the Llantrisant and Llantwit Rural District Council, and applying to the portions of the undertaking in their respective areas; but they are only operative after the expiration of a period ten years. In the Bill, the Company asked for authority to acquire, by agreement or arbitration, the existing public supply of gas from the private gas-works at Tondu, belonging to North's Navigation Company, Limited. There is nothing referring to such acquisition in the Act; but there appears this clause for the protection of North's Navigation Collieries (1889), Limited: "The Company shall not supply gas for use within any portion of the Penybont Rural District, except so much thereof as is included within their limits of supply." [*Parliamentary Agents: Messrs. W. & W. M. Bell.*]

The limits of supply of the Gosport Gas Company are now defined as including Gosport and Alverstoke, Crofton, Rowner, Sarisbury, Hook, with Warsash and Titchfield. Lands now in the occupation of the Company are scheduled for manufacturing and storage purposes. Power is given to charge, in any part of the limits of supply outside the urban district of Gosport and Alverstoke, a price per 1000 cubic feet not exceeding 6d. in excess of the charge for the time being made in the urban district. From Jan. 1 next the ordinary shares of the Company are to be consolidated and converted into stock of the nominal amount of £53,125, bearing a uniform dividend of 6 per cent. This stock is to be divided among the shareholders in the proportion of £35 8s. 4d. for each share. Power is given to the raising, subject to the new auction clauses, of £33,000 (£48,000 was mentioned in the Bill), with one-third borrowing powers. Respecting the existing ordinary capital, the Company are authorized to borrow £18,500, inclusive of £12,500 already raised. The special purposes fund is included in the Act; but in respect to net revenue balances, the sum allowed to be carried forward is not to exceed the amount required for a year's dividend. A reserve fund is provided for. The standard price of gas in Gosport and Alverstoke is to be 3s. 6d. per 1000 cubic feet; and the sliding-scale operates on penny changes in price with 3s. per cent. variations in dividend. The Company consent to all mains laid hereafter being at a depth of not less than 2 feet, unless otherwise agreed between the local authority concerned and the Company. The standard illuminating power is to be 14 candles, tested by the "Metropolitan" No. 2 burner and the Harcourt 10-candle pentane lamp. The proposition in the Bill as to the alteration of the public lighting clause in the Company's Act of 1865, by inserting "for lighting purposes," was deleted. [*Parliamentary Agents: Messrs. Dyson and Co.*]

The Llanelly Gas Act is principally a money measure. The Company are allowed to raise £45,000 of additional capital, which is £15,000 less than the sum in the Bill as originally deposited. The borrowing powers granted are an additional sum not exceeding £4166 in respect of the capital authorized by the Act of 1874, and up to one-third of the additional capital. Included in the Act are the special purposes fund and power to create a reserve fund; and the new auction clauses are also included. The additional capital is to carry a 7 per cent. dividend, except so much as is raised as preference, upon which 5 per cent. may be paid. The standard price of gas is to be 4s. 1d. per 1000 cubic feet in the borough (2d. less then in the Bill), and 4s. 6d. outside, "provided that the Company may increase or reduce the price charged by them for gas above or below the said standard prices." The sliding-scale is to operate half yearly on the usual terms. The standard illuminating power is to be 14 candles, tested by the "Metropolitan" No. 2 burner and the Harcourt pentane lamp. In the Bill the old discounts clause appeared; it has been expunged, and the required addition made to clause 13 of the 1847 Act, which gives liberty under conditions. Section 38 of the Company's Act of 1874 gave the Local Board power to appoint an additional Director on the Board of the Company; but this is now repealed. Provision is made for the Company, on request in writing, delivering to the Council, as soon as practicable after the completion of the audit of the Company's accounts, a certificate signed by the Company's Auditor as to the lowest price charged by the Company during the year or half year to any private consumer. This is for the purposes of section 49 of the Company's Act of 1874. Another provision is that "the Company shall lay down main pipes and supply gas to any public lamps within the urban district of Llanelly which, or the first of which, shall be erected within 55 yards from any main pipe of the Company, and which shall not be more than 55 yards apart. [*Parliamentary Agents: Messrs. R. W. Cooper and Sons.*]

Passing over the extensive water section of the Rhymney and Aber Valleys Gas and Water Act, the gas clauses are comparatively few. Additional lands are scheduled for gas manufacturing purposes. In addition to the amount of preference capital authorized in 1905, the Company are empowered to attach a preferential dividend of 6 per cent. to a further part of the balance of unissued ordinary capital sanctioned in 1898 to an amount not exceeding £50,000, by the creation and issue of new preference shares; and further to issue £60,000 of the preference capital authorized under the Act of 1905, also with a preferential dividend of 6 per cent. attached. The standard illuminating quality of the gas is to be 14 candles (and not 12 as proposed in the Bill). The test-burner is to be the "Metropolitan" No. 2; but the standard of light is not specified. Certain outlying places have ensured that the price of gas shall not in their areas at any time exceed

4s. 9d. per 1000 cubic feet, and after three years 4s. 6d. The maximum price to be charged for public lighting in any district is in no case to be higher than 10 per cent. below the charge made by the Company to the private consumers within such district. [*Parliamentary Agents: Messrs. W. & W. M. Bell.*]

## PRIZES OFFERED BY THE SOCIÉTÉ DU GAZ.

### Special Competition for Small Gas-Engines.

For their congress in 1909, the Société Technique du Gaz hold out the usual inducements to gas-workers in all countries to compete for the various prizes offered in different classes. These prizes may be given, not to engineers only, but to foremen and any workmen who have effected notable progress in apparatus of the following categories:—

(1) Apparatus for the manufacture and utilization of gas; (2) incandescent gas-burners working under normal conditions; (3) automatic gas-lighting at a distance; (4) gas apparatus for domestic uses; (5) industrial and domestic apparatus for coke; and (6) poor-gas or water-gas producers using gas-works coke.

Any apparatus submitted must have already been adopted in practical working, and must be sent to the French Gas Society before Jan. 1. The prizes vary in value from 5000 frs. (£200) to 10,000 frs. (£400). Other particulars can be obtained from the Secretary of the Société Technique du Gaz, 105, Rue Saint-Lazare, Paris.

There are, in addition to the foregoing, two special classifications for next year. Class A comprises a competition for the small domestic gas-engine; and for intensive gas lighting, with or without high pressure. Class B includes the utilization and treatment of ammoniacal liquor in medium or small gas-works, and the general employment of tar for industrial heating or other purposes. A special circular is sent out by the Société Technique dealing with the regulations for the small gas-engine competition. We need not here give them at length, as intending competitors can themselves apply for the necessary information. Suffice it to say that the engines must be sent in by March 1 next, and will be divided into three classes: (*a*) Under 2 H.P; (*b*) between 2 and 5 H.P.; and (*c*) above 5 H.P. The tests will commence on May 1; and the only expense the competitor will have to bear will be for the lubrication during the test. Successful competitors will receive an honorary award and diploma, in addition to which the value of the prizes may be any sum up to 10,000 frs., or £400. It may be added that the idea of the competition is to encourage the output of engines of small dimensions, analogous to automobile engines, and capable of being set in motion easily and frequently. We trust that there will not be wanting some British competitors in this class or others.

Another international and open competition is the usual yearly one for the best essay on any subject of interest to the gas industry. Particulars of this are the same as in former years, and need not be repeated—except to remind possible authors that March 1 next is, according to regulation, the date named for the submission of the papers.

## Messrs. Graham, Morton, and Co.

Our readers may remember that about a year ago the above-named Company was taken over and restarted on its present lines. There are only three partners in the concern—Mr. W. B. Leech, who has had large experience in the erection of retort-benches, including bench ironwork fittings, bunkers, conveying-plant, &c., both in England and abroad; Mr. C. A. Goodall, who undertakes the commercial part of the business; and the firm of Messrs. Clayton, Son, and Co., Limited, of Hunslet. In the period which has elapsed since the restarting of the Company, new works have been built and equipped with the latest type of machinery, and several contracts executed. At the present time, others are in hand for conveying-plants, &c., for the Chatham Dockyard, the Fulham station of the Gaslight and Coke Company, the British Aluminium Company, of Kinlochleven, the Leeds Corporation Gas-Works, Messrs. J. Marshall and Co., of Glasgow, the Bessemer Steel-Works, &c. The Company have also, as mentioned in the "Journal" last week, been entrusted with the contract for the retort-settings, brickwork, &c., for the six beds of ten Dessau vertical retorts about to be erected at the Sunderland Gas-Works.

**Manchester and District Junior Gas Association.**—The first meeting in the eleventh session of the Association will be held next Saturday afternoon, in the Central Technical School, Byrom Street, Manchester, when Mr. R. E. Gibson, of Liverpool, will read a paper entitled "Notes on the Adaptation of Old Retort-Houses to Modern Methods of Carbonization." It is proposed that at the close of the paper the members shall take tea together, and have the discussion afterwards. The synopsis of the paper which has been issued by the Hon. Secretary (Mr. J. Alsop) with the programme of the meeting, shows that Mr. Gibson has gone very fully into the subject he has chosen; and it is to be hoped the members will do their best to be present on the occasion.

## TECHNOLOGY OF DESSAU VERTICAL RETORTS.

IV.

By Thomas Holgate, M.Inst.C.E., F.C.S.

In the first of these articles (*ante*, p. 640), the writer expressed the intention of not going outside the figures from the various works operating the Dessau retort; and he does not now propose to depart from that mode of inquiry, except to further elucidate those figures. Without going so far as to compare the commercial values of the Bournemouth and Dessau systems, it will be found that a valuable insight into the two will be gained by comparing the analytical and calorific data.

In the last number of the "Journal" (p. 786), it was shown that calculations of the unsaturated hydrocarbons in the Dessau gas, on the basis of propylene, yielded results nearly in accord with the observed values of calorific power, and that adopting ethylene alone would be inadequate; and the writer further said that the coincidence with propylene had been observed by others in regard to illuminating power tests. On referring to his authority for the last statement, he finds that the coincidence was not as to the illuminating power, but as to the calorific power, which confirms the calculations already given. The gas just alluded to was coal gas made from Yorkshire coal in retorts both inclined and horizontal, and mixed possibly with a small percentage of carburetted water gas; and the analyses and calorimetric tests were carried out with the greatest care.

The only analysis available of gas made in a setting of Messrs. Woodall and Duckham's retorts—viz., that at Nine Elms—shows, in the matter just referred to, complete divergence from, and in other matters equally important contrasts with, those from Dessau. To understand the significance of the figures to be adduced, it will be advisable first to explain more fully the provisional adoption of propylene as the basis of estimation for the unsaturated hydrocarbons. It is not suggested that all these gases are olefines, much less propylene; but the mode of ascertaining by analysis makes it possible that other series may be represented therein. The figures returned for the unsaturated hydrocarbons are sometimes found by absorption by bromine, but now more generally by fuming sulphuric acid; the latter most likely being adopted in the cases under consideration. It is quite possible, therefore, that besides olefines some members of the benzene series are included therein. Ordinary coal gas and the Dessau gas appear to have in their "unsaturated hydrocarbons" a quota of benzene; but the sample from Nine Elms—judged by the calorific power figures adduced later—appears to be without this constituent. While propylene, then, nearly represents the average of the hydrocarbons in question in ordinary practice, yet it is better to see that probably they consist of ethylene and benzene, with the former in the ascendency as to volume. It is possible to so proportion these two constituents as to get figures that fit the observed values even better than the assumption of equivalence to propylene.

Table XI.

| — | Calorific Power of Gases per Cubic Foot. | | | Line No. |
|---|---|---|---|---|
| | Gross. | Net. | Difference. | |
| Methane . . . . . $CH_4$ | 1070 | 958 | 112 | 1 |
| Acetylene . . . . . $C_2H_2$ | 1562 | 1506 | 56 | 2 |
| Ethylene . . . . . $C_2H_4$ | 1677 | 1565 | 112 | 3 |
| Propylene . . . . . $C_3H_6$ | 2480 | 2312 | 168 | 4 |
| Benzene . . . . . $C_6H_6$ | 4022 | 3854 | 168 | 5 |
| Two volumes of ethylene, one of propylene, and one of benzene . . . . | 2464 | 2324 | 140 | 6 |
| Three volumes of ethylene, one of propylene, and one of benzene . . . . | 2306·6 | 2172·2 | 133·8 | 7 |
| Two volumes of ethylene and one of benzene . . . . . | 2458 | 2328 | 130 | 8 |

The figures are from the most recently published researches of Professor Julius Thomsen, and show for methane 1070 B.Th.U. instead of the usually accepted 1074 B.Th.U. per cubic foot. It should also be mentioned that, besides olefines, there are polymethylenes and naphthenes isomeric therewith, but having a different heat of combustion. It is only within the past few months that Felix B. Ahrens has discovered one of these isomers—nononaphthene ($C_9H_{18}$)—in the xylene fraction from coal tar, and, therefore, some of its vapour, though probably only a small quantity of such a body, boiling at 138° C., is present in coal gas. Still, if the higher naphthenes are in the tar, the lower ones may be in the gas; and it is desirable to know more upon this point, although the heat of combustion is not likely to vary much from the corresponding olefines.

Confining our purview to ethylene, which provisionally may represent the olefines and naphthenes, and to benzene, which may represent also the other aromatics—toluene, xylene, naphthalene, &c.—we shall see that for the gas made at Dessau on the day of steaming, the best assumption is the last line of Table XI.; and this is embodied on line 5 of Table XVII. But other proportions of these two constituents may be predicated that will conform to

the observed values of gross, net, and difference of calorific powers in various instances. If, however, the analysis from Nine Elms represents normal working, then in the unsaturated hydrocarbons of gas from the Bournemouth retort there is a quite marked divergence from this rule.

Table XII. compares the Nine Elms sample with that of Dessau on the day of steaming; the latter being calculated to 100 per cent., and not to 99·74 as in the British report; so that it may be exactly parallel in this respect to Nine Elms. Alongside is given an analysis of South Metropolitan gas when the 16-candle quality, judged by the No. 1 "London" argand burner, was in vogue, and when the make was probably about 10,000 cubic feet per ton of coal. The detailed percentage composition of the combustible portion of the three gases is affected by the incidence of the magnitude of the incombustibles; and, to get some further insight, Table XIII. has been compiled upon the basis of combustibles alone.

TABLE XII.

| — | Nine Elms. Verticals. | Dessau. Second Day's Test. (Steam'd) | Differences. | South Metropolitan Coal Gas. | Line No. |
|---|---|---|---|---|---|
| Carbon monoxide . . . .CO | 7·41 | 6·888 | + 0·522 | 4·10 | 1 |
| Hydrogen . . . . . $H_2$ | 45·85 | 57·820 | −11·97 | 50·70 | 2 |
| Methane . . . . . $CH_4$ | 35·05 | 28·404 | + 6·606 | 37·80 | 3 |
| Simple combustibles . . . . | 88·31 | 93·11 | − 4·80 | 92·60 | 4 |
| Complex do. . . $C_nH_m$ | 2·88 | 2·98 | − 0·10 | 4·40 | 5 |
| Total combustibles . . . . | 91·19 | 96·09 | − 4·90 | 97·00 | 6 |
| Oxygen . . . . . $O_2$ | 0·27 | 0·30 | − 0·03 | .. | 7 |
| Nitrogen . . . . . $N_2$ | 6·32 | 2·61 | + 3·71 | 3·00 | 8 |
| Carbon dioxide . . . . $CO_2$ | 2·22 | 1·00 | + 1·22 | .. | 9 |
| Total non-combustibles . . . | 8·81 | 3·91 | + 4·90 | 3·00 | 10 |
| Total accounted for. . . . | 100·00 | 100·00 | 0·00 | 100·00 | |
| Cubic feet of gas per ton . . | 12,423 | 11,680 | + 743 | .. | 11 |
| Illuminating power. . . . | 15·82 | 15·37 | + 0·45 | .. | 12 |
| Observed calorific powers: gross . . | 596·60 | 595·66 | + 0·93 | .. | 13 |
| Observed calorific powers: net . . . | 530·70 | 534·66 | − 3·96 | .. | 14 |
| Observed calorific powers: difference . | 65·90 | 61·00 | + 4·90 | .. | 15 |

But as the figures stand in Table XII., they show a higher illuminating power for Nine Elms, which apparently must be accounted for by the higher percentage of methane. In the tests of Dr. Percy F. Frankland made before the advent of the Carpenter burner, he, by careful observation, found the luminosity of methane to be 5·15 candles per 5 cubic feet. But it is believed by persons competent to judge that in the No. 2 "Metropolitan" argand this efficiency is at least doubled. What is noticeable about the calorific powers per cubic foot on lines 13, 14, and 15 is the close resemblance of the observed values at Nine Elms and Dessau, except the disparity in the difference figure. But, as will appear on closer examination, this coincidence does not follow from identity in the nature of the gases in question.

TABLE XIII.

| — | Nine Elms. | Dessau. | South Metropolitan. |
|---|---|---|---|
| Carbon monoxide . . . .CO | 8·126 | 7·168 | 4·227 |
| Hydrogen . . . . . $H_2$ | 50·280 | 60·172 | 52·268 |
| Methane . . . . . $CH_4$ | 38·436 | 29·560 | 38·969 |
| Unsaturated hydrocarbons . $C_nH_m$ | 3·158 | 3·100 | 4·536 |
| Combustibles per ton, cubic feet . | 11,328 | 11,223 | Estimated about 10,000 |

Table XIII., by eliminating the portion more or less accidentally present reveals the essential proportions of the combustible components. It must not be forgotten that the first two columns represent an admixture with water gas, while the latter is pure coal gas, produced, doubtless, at a moderate temperature before the advent of high makes. To bring into account the effect of the volume of gas produced per ton of coal, Table XIV. is necessary.

TABLE XIV.—*Quantity of Each Component Produced, in Cubic Feet per Ton of Coal.*

| — | Nine Elms. (Woodall-Duckham Continuous Retorts.) | Dessau. (Intermittent Retorts.) | Differences. |
|---|---|---|---|
| Carbon monoxide . . .CO | 920·54 | 804·5 | + 116·04 |
| Hydrogen . . . . . $H_2$ | 5,695·94 | 6,753·4 | − 1057·46 |
| Methane . . . . . $CH_4$ | 4,354·26 | 3,317·3 | + 1036·96 |
| Simple combustibles . . . | 10,970·74 | 10,875·2 | + 95·54 |
| Complex do. . $C_nH_m$ | 357·78 | 348·1 | + 9·68 |
| Total combustibles . . . | 11,328·53 | 11,223·3 | + 105·23 |
| Total non-combustibles . . | 1,094·47 | 456·7 | + 637·77 |
| Observed volumes . . . | 12,423·00 | 11,680·0 | + 743·00 |

It is now seen that, each using English coal, the Nine Elms retorts produced per ton of coal 105·23 cubic feet of combustible gas more than the Dessau retorts; but this was accompanied by 637·77 cubic feet excess of non-combustible. The outstanding feature is the quantity of methane at Nine Elms as against hydrogen at Dessau; but the former per cubic foot of gas is only on a par with the South Metropolitan gas of former days, as shown in Table XIII. The South Metropolitan production per ton of coal cannot be put into Table XIV., because the definite volume per ton is not known. Nine Elms and Dessau have about equal volumes of unsaturated hydrocarbons; but they are both 30 per cent. below that of the South Metropolitan, when measured only per cubic foot (line 4 of Table XIII.). The calorific power of the mixed gases shown in Table XIV. is now compared in Tables XV. and XVI.

Although, as already pointed out, the Nine Elms gas is not, per cubic foot, superior to the South Metropolitan gas in the methane content, yet per ton of coal it may possibly be so, and it is shown distinctly in advance of the Dessau, as set forth in

TABLE XV.—*Calorific Power of the Gas from One Ton of Coal in the Vertical Retorts at the Nine Elms Works.*

| Constituent of the Gas Mixture. | Volume in Cubic Feet. | Gross Calorific Power of Gas. | | Net Calorific Power of Gas. | | Difference. | | Line No. |
|---|---|---|---|---|---|---|---|---|
| | | Per Cubic Foot. | Per Ton of Coal. | Per Cubic Foot. | Per Ton of Coal. | Per Cubic Foot. | Per Ton of Coal. | |
| Carbon monoxide . . . . .CO | 920·54 | 342 | 314,824 | 342 | 314,824 | .. | .. | 1 |
| Hydrogen . . . . . $H_2$ | 5,695 94 | 344 | 1,959,403 | 288 | 1,640,431 | 56 | 318,972 | 2 |
| Methane . . . . . $CH_4$ | 4,354·26 | 1070 | 4,659,058 | 958 | 4,171,381 | 112 | 487,677 | 3 |
| Total simple combustibles . . . | 10,970·74 | 631·98 | 6,933,285 | 558·45 | 6,126,636 | 73·53 | 806,649 | 4 |
| Unsaturated hydrocarbons . .$C_nH_m$ | 357·78 | 1336·80 | 478,277 | 1303·17 | 466,250 | 33·63 | 12,027 | 5 |
| Total combustibles . . . . . | 11,328·53 | 654·24 | 7,411,562 | 581·97 | 6,592,886 | 72·27 | 818,676 | 6 |
| Total non-combustibles . . . . | 1,094·47 | .. | .. | .. | .. | .. | .. | 7 |
| Observed values . . . . . | 12,423·00 | 596·6 | 7,411,562 | 530·7 | 6,592,886 | 65·9 | 818,676 | 8 |

TABLE XVI.—*Calorific Power of Gas Made per Ton of Coal in Vertical Retorts (Second Day of Dessau Tests).*

| — | Volume in Cubic Feet. | Gross Calorific Power. | | Net Calorific Power. | | Difference due to Condensation. | | Line No. |
|---|---|---|---|---|---|---|---|---|
| | | Per Cubic Foot. | Per Ton of Coal. | Per Cubic Foot. | Per Ton of Coal. | Per Cubic Foot. | Per Ton of Coal. | |
| Carbon monoxide . . . . . CO | 804·5 | 342 | 275,139 | 342 | 275,139 | *Nil* | *Nil* | 1 |
| Hydrogen . . . . . $H_2$ | 6,753 4 | 344 | 2,323,169 | 288 | 1,944,979 | 56 | 378,190 | 2 |
| Methane . . . . . $CH_4$ | 3,317·3 | 1070 | 3,549,511 | 958 | 3,177,973 | 112 | 371,538 | 3 |
| Simple combustibles . . . . . | 10,875·2 | 565·3 | 6,147,819 | 496·37 | 5,398,091 | 68·93 Negative | 749,728 Negative | 4 |
| Complex ,, . . . . . $C_nH_m$ | 348·1 | 2325·7 | 809,568 | 2432·7 | 846,816 | 107 | 37,248 | 5 |
| Total combustibles . . . . . | 11,223·3 | 619·898 | 6,957,387 | 556·416 | 6,244,907 | 63·482 | 712,480 | 6 |
| Total non-combustibles . . . . | 456·7 | .. | .. | .. | .. | .. | .. | 7 |
| Observed values . . . . . | 11,680·0 | 595·66 | 6,957,387 | 534·66 | 6,244,907 | 61 | 712,480 | 8 |

TABLE XVII.—*Relation of Heating Power of Unsaturated Hydrocarbons per Ton of Coal (Nine Elms and Dessau).*

| — | Cubic Feet Per Ton. | Gross Calorific Power. | | Net Calorific Power. | | Difference. | | Line No. |
|---|---|---|---|---|---|---|---|---|
| | | Per Cubic Foot. | Per Ton of Coal. | Per Cubic Foot. | Per Ton of Coal. | Per Cubic Foot. | Per Ton of Coal. | |
| Nine Elms, observed value by difference | 357·78 | 1336·8 | 478,277 | 1303·17 | 466,250 | 33·63 | 12,027 | 1 |
| ,, ,, calculated for ethylene | 357·78 | 1677·0 | 599,997 | 1565·00 | 559,926 | 112 | 40,071 | 2 |
| ,, ,, calculated for acetylene | 357·78 | 1562·0 | 558,852 | 1506·00 | 538,816 | 56 | 20,036 | 3 |
| Dessau, observed values by difference, Table XVI. | 348·1 | 2325·7 | 809,568 | 2432·7 | 846,816 | Negative 107 | Negative 37,248 | 4 |
| ,, assumed values, 2 vols. ethylene to 1 of benzene. | 348·1 | 2458 | 855,630 | 2328·0 | 810,377 | Positive 130 | Positive 45,253 | 5 |

TABLE XVIII.—*Relation of Heating Power of the Whole of the Combustible Gases per Ton of Coal (Nine Elms and Dessau).*

| — | Illuminating Power, excluding Non-Combustibles. | Cubic Feet of Gas. | Gross Calorific Power. | | Net Calorific Power. | | Difference in Calorific Power. | | Line No |
|---|---|---|---|---|---|---|---|---|---|
| | | | Per Cubic Foot. | Per Ton of Coal. | Per Cubic Foot. | Per Ton of Coal. | Per Cubic Foot. | Per Ton of Coal. | |
| Nine Elms | 17·35 | 11,328 | 654·24 | 7,411,562 | 581·97 | 6,592,886 | 72·27 | 818,676 | 1 |
| Dessau | 16·00 | 11,223 | 619·90 | 6,957,387 | 556·46 | 6,244,907 | 63·48 | 712,480 | 2 |
| Difference observed | 1·35 | 105 | 34·34 | 454,175 | 25·51 | 347,979 | 8·79 | 106,196 | 3 |
| Difference per cent. | 7·9 | 0·9 | 5·2 | 6·1 | 4·4 | 5·3 | 12·1 | 12·9 | 4 |

Table XVI. The figures for calorific power shown on line 5 are noteworthy. They have been calculated by difference, obtained by subtracting line 4 from the observed values on line 8.

The calorific power of the unsaturated hydrocarbons so calculated is lower than for pure ethylene, or even of the unlikely constituent acetylene, not to say of either propylene or benzene. The calorific power of each cubic foot of combustible gas, given on line 6 has been obtained by dividing line 8 by the volume of combustibles—11,328 cubic feet. The high figure for gross calorific power and the high difference of 72·27 are noteworthy.

Having now obtained in Tables XV. and XVI. the data necessary, the comparison of Dessau with Nine Elms retorts, as to the heating power of the unsaturated hydrocarbons, can now be made and may be seen at a glance in Table XVII. The observed values for Dessau somewhere contain an error, because they yield figures for the net of the unsaturated hydrocarbons higher than the gross, as shown on line 5 of Table XVI. But this anomaly can be easily understood, and, as an attempt at approximation, is met by substituting, as in Table XVII., on line 5, in lieu of line 4. The assumed value is that of two volumes of ethylene to one volume of benzene, which mixture is equal to 2458 and 2328 gross and net respectively, in lieu of propylene 2480 and 2312, which were in previous calculations applied to all the three analyses of the Dessau tests.

Line 1 of Table XVII. shows the observed value for unsaturated hydrocarbons at Nine Elms to be slightly over one-half that of Dessau on line 4, and that it is appreciably lower than ethylene alone. Line 3, showing the values for acetylene, is inserted not because there is any evidence of the presence of that gas, but because it is the one nearest in approach in calorific power to the observed values. A more likely interpretation is that the gas is ethylene, and that the disparity is due to all the errors of observation being accumulated in the figure called "observed value."

It is worth pointing out that if the carbon density and hydrogen density of the unsaturated hydrocarbons were to accompany the analysis, then the obscurity we are dealing with could be largely, and possibly entirely, cleared up. Some of the analyses of Mr. Lewis T. Wright give such particulars, and are a testimony to his extreme care in conducting his researches. Unfortunately, his results were incomplete for lack of calorimeter tests—now, however, easily procurable. What is needed nowadays is a combination of the two factors of the case.

Table XVIII. shows that per cubic foot of combustible and per ton of coal the Nine Elms gas is highest in calorific power; and as this superiority is not in the percentage volume unsaturated hydrocarbons, it must emanate from the methane. This explanation apparently applies also to the illuminating power; but it must be remembered that in the analyses methane figures may include other members of that homologous series. Ethane and propane, the succeeding members to methane in that series, may have been present in either gas, and if so would destroy the rigour of this comparison, although it is unlikely there would be such quantities present to invalidate the argument. With this qualification, the methane pre-eminence of Nine Elms is shown by comparing line 3 of Tables XV. and XVI., and is reflected in the difference figures 72·27 and 63·48 respectively on lines 1 and 2 of Table XVIII. What these really signify is shown by Table XIX., which gives the methane content of a gas from coal distilled at (1) dull red, (2) bright red, and (3) bright orange, in horizontal retorts, determined by Mr. Lewis T. Wright; and with these are compared the Nine Elms and Dessau figures.

In this single constituent, Dessau is low; but it is correspondingly high in volume of hydrogen, and it also appears to have some advantage in the unsaturated hydrocarbons, but without any corresponding gain in illuminating power.

TABLE XIX., *Showing Methane Produced.*

| — | Cubic Feet of Methane Produced from one Ton of Coal. | Total Combustibles per Ton of Coal. | Methane per Cent. of Total Combustibles. |
|---|---|---|---|
| Nottingham horizontals (1) | 3524 | 8,009 | 44 0 |
| Nottingham horizontals (2) | 3344 | 9,363 | 35·7 |
| Nottingham horizontals (3) | 3686 | 11,668 | 31·6 |
| Nine Elms verticals | 4354 | 11,328 | 38·4 |
| Dessau verticals | 3317 | 11,223 | 29 5 |

How the gas made in the two types of vertical retort compares with the gas at present being distributed by the London Companies is given in Table XX., which represents the average quality of the Metropolitan gas delivered during one week in June last.

TABLE XX.

| Company. | Illuminating Power in Candles. | Calorific Power per Cubic Foot in B.Th.U. | | |
|---|---|---|---|---|
| | | Gross. | Net. | Difference. |
| Gaslight and Coke | 16·95 | 585·00 | 522·20 | 62·80 |
| South Metropolitan | 16·935 | 589·58 | 526·96 | 62·62 |
| Commercial | 15·44 | 565·60 | 507·66 | 57·94 |
| Nine Elms (observed) | 15·82 | 596·60 | 530·70 | 65·90 |
| Dessau ,, | 15·37 | 595·66 | 534 66 | 61·00 |

**Discovery of Nononaphthene in Coal Tar.**—Herren F. B. Ahrens and Leo von Mozdzenski announce that they have found in coal tar one of the hydrocarbons characteristic of Russian petroleum—viz., nononaphthene ($C_9H_{18}$). As is well known, the naphthene series, though isomeric with the olefine series, is not identical therewith. Xylene obtained from coal tar was found on nitration to yield an oil having a boiling point of 137° to 139° C., and of density = 0·7662 at 15° C. The quantity of nononaphthene present is not stated; but, in view of the fact that xylene is known to be an effective washing agent for removing naphthalene from coal gas, its presence, even if only in small quantity, is of interest.

**The World's Coal Output.**—The Antwerp Chamber of Commerce, which undertakes the task of recording each year the total coal output of the world, has just published the report for the year 1906—the latest date for which reliable statistics of so comprehensive a nature can be obtained. The total output of the world for that year is stated at 893,249,557 tons—an increase of nearly 50 million tons, as compared with the output of the preceding year, which totalled 844,194,217 tons. In 1896 the world's output stood at 546,742,207 tons, in 1886 at 303,207,780 tons, in 1870 at 203,321,112 tons, and in 1850 at 89,881,357 tons. The United States still hold the place of honour which they first gained in 1899; their output for 1906 being 375,397,000 tons, or more than 42 per cent. of the world's total. Next comes Great Britain with 251,050,000 tons—a little more than 28 per cent. of the total; while Germany, with 136,480,000 tons, or about 15 per cent. of the total, holds the third place. France makes a bad fourth with 34,313,000 tons; while Belgium (the fifth country on the list) stands for only 23,610,000 tons. Japan, which produced not more than 1,243,000 tons in 1905, the following year totalled 12,500,000 tons; while Canada's production of 9,916,000 tons in 1906 was five times as much as it was twenty years before.

# NIGHT VIEWS AT THE FRANCO-BRITISH EXHIBITION.

### The Outdoor Lighting by the Keith New High-Pressure Lamps.

SOME of our electrical friends profess to a difficulty in finding any gas lighting at the Franco-British Exhibition, except a few odd specimens that are now worthy of a place in a museum. Perhaps the accompanying photographs, taken from different points of view, will enable them to realize that there is rather a considerable portion of the grounds illuminated on the very latest system of high-pressure gas lighting. We do not claim the outlining of the buildings—that is mere ornamental work for which incandescent

electric lamps are very suitable; but when we come to more practical and useful purposes, the tables are changed.

The views are of the portion of the grounds lighted by the new Keith high-pressure gas-lamps; and the long dark evenings and variable atmospheric conditions afford an excellent opportunity of judging the performances of the lamps. They have kept up the excellent reputation made quite at the outset of their lives; and the only criticisms we have heard have been that the lighting would have been still more effective had the lamp standards been somewhat higher and of rather more ornate appearance. As the plan published by us on June 2 (p. 562) indicated, the lighting extends from the "Flip-Flap" over all the intermediate space to the broad sweep of the Grand Avenue of the Colonies, extending from Empire Avenue round to the Stadium. The lamps, it will be remembered, are of 1500-candle power; the consumption of gas, supplied at 55 inches pressure, being only 25 cubic feet per hour each. The efficiency is therefore equal to 60 candles per cubic foot. The construction of lamp which gives this high efficiency was fully described in our columns on May 5 last. The number of these lamps at the exhibition is about 230. The illuminating efficiency per cubic foot of gas consumed is, of course, their main feature. Electricians are fond of reducing the cost of lighting by electric arc lamps to the basis of candle power per hour. The consumption of gas by these lamps is 0·0166 cubic foot per candle power per hour. It may interest our electrical friends to work out the cost of this 0·0166 cubic foot of gas at the prices charged per 1000 cubic feet for public lighting in their respective localities.

## THE RELATIVE DANGER OF GAS AND OTHER ILLUMINANTS.

### Statistics of Accidents in Germany.

Herr F. Schäfer, of the German Continental Gas Company, of Dessau, has compiled for last year a statistical summary of accidents due to town gas, electricity, petroleum, spirit, benzoline, and acetylene occurring within the German Empire and resulting in personal injury. It was published in a recent number of the "Journal für Gasbeleuchtung." Accidents which merely caused material damage were not included. It will be remembered that Herr Schäfer prepared a similar set of statistics last year relating to 1906 (see "JOURNAL," Vol. XCIX., p. 182).

The number of accidents now reported is considerably greater than in the previous year; but this is probably merely due to slight injuries having been more closely registered. All told, the number of accidents increased from 546 in 1906 to 701 in 1907, and the number of persons injured from 649 to 940. The number of fatalities, however, rose only from 286 to 299. Of the latter, 43·5 per cent. were due to petroleum, 22·4 per cent. to spirit, 16 per cent. to electricity, 13·4 per cent. to coal gas, 2·7* per cent. to benzoline, and 2 per cent. to acetylene. Discussing each illuminant or heating agent separately, it is pointed out that of the accidents due to town gas almost exactly one half were caused by the escape of gas unburnt, and the other half by explosion. The number of persons injured by the explosions was, however, considerably greater than by the simple escapes; and the fatalities caused by the explosions were 38, against 2 caused by unconsumed gas. That the fatalities caused by gas have not increased in as high a proportion as the consumption and number of consumers is ascribed to improved modes of saving life, and the increased use of oxygen in cases of gas poisoning. Known cases of suicide and murder by gas—viz., 11—involving 18 victims, and 9 cases of attempted suicide have not been included; but probably a number of the other cases were also of the same class. Five officials and workmen of gas-works were killed, against 11 in 1906. The most prolific cause of accidents is again the use of a light to detect leaks. There were many cases of accidents due to the turning off of gas at the main cock at night. Eleven cases of india-rubber tubing having given way and caused accidents are reported, and one accident was due to a water-slide fitting. On the other hand, no accidents are reported as due to the fall of glass globes or chimneys, notwithstanding the fact that in some quarters an increase in such accidents was anticipated as the result of the introduction of inverted gas-burners. In the Press notices of accidents, it was found that many were ascribed to coal gas which were in reality due to smoke or carbonic oxide from other sources.

The increase in serious accidents and fatalities due to electricity over those for 1906 is probably greater than the increase in the number of electric installations or of current consumed. In all probability a large number of slight accidents have not been reported. Notwithstanding the much smaller use of the electric current as compared with town gas, the number of fatalities is greater from the former. Deaths due to lightning striking the conductors have not been included, although in many cases they may be indirectly attributed to the use of electricity. Anyhow, it is extremely rare for lightning to strike gas services or mains. Attempts at resuscitation after accidents due to electricity again proved almost fruitless.

The number of accidents, and of victims thereof, caused by the use of petroleum were more than in the previous year, though not so many as in 1905. The consequences were in general far more serious than those of town gas explosions. The most fruitful source of accidents was the use of petroleum to quicken fires, but the lighting, re-filling, extinguishing, and overturning of lamps were also responsible for very many mishaps. The consequences of accidents with spirit have been more serious than in the previous year. Having regard to the fact that for lighting and heating purposes spirit in Germany is twice as costly as town gas, it would seem as though the danger from the use of spirit in towns might be avoided by a prohibition of its employment where gas is available. The increase of accidents from benzoline or petrol is due to the development of motor-car traffic. There is a slight decrease in the number of accidents from acetylene, probably owing to the effect of closer supervision of the installations. The accidents in most cases can be traced to neglect of instructions. No spontaneous explosions of acetylene were reported.

In addition to the six sources of energy (or illuminating and heating agents) named, there have been five accidents, whereby 11 persons were injured (one fatally) through air gas. Three oil gas accidents resulted in the death of two persons. Suction-gas producers were responsible for seven accidents, resulting in 9 men being rendered insensible, one of whom could not be revived. Blast-furnace and other industrial gases caused six accidents, with 14 victims, of whom five lost their lives. Among other explosions may be mentioned dust explosions, of which three occured in briquette factories and one in a wood-meal factory; and eight due to slow burning stoves for heating rooms. In addition to the foregoing, there were 69 accidents, involving 102 victims, of whom 80 lost their lives, caused by the inhalation of carbonic oxide gas arising from stoves for heating, baking, and water-heating. In twelve of these cases, the carbonic oxide was derived from the use of embers, or dust fuel for cooking, which is very popular in certain districts and hinders the spread of gas-cookers there.

* There is a discrepancy in the figures in the original, which makes it doubtful whether there were 18 or 8 deaths due to benzoline. The 2·7 per cent. quoted assumes that the latter figure is correct.—ED. J.G.L.

## A BRAY BIJOU BURNER.

BURNERS of the vertical inverted pattern are now to be made by Messrs. Geo. Bray and Co., Ltd., in three sizes—a bijou having been this season added to the intermediate and full sizes previously on the market. The new form, which can be had with or without an adjuster, should prove a welcome addition to the firm's already long list of gas-lighting appliances, particularly as it possesses the advantage of being arranged to take any make of bijou mantle, whereas for the intermediate pattern a special mantle is needed. The now well-known reversible inverted burner, which fits any kind of gas-bracket without the use of an adapter, and which is made in two sizes, is, we learn, meeting with a splendid sale. This is more especially the case with the smaller of the two sizes, which, however, is larger than a bijou. In a small-sized room, a very good light can be obtained by the use of one of these burners. The air-chamber being right away from the products of combustion, the air supply is always perfectly fresh; while the distance which the burner is removed from the fitting prevents the blackening of the latter to any extent. In connection with this burner one little improvement has been made which, though it has nothing to do with the lighting effect obtained, adds something to the lamp from an ornamental point of view. Hitherto the patent spring globe holder (the object of which is to obviate the breaking of globes and to facilitate their removal when necessary) has consisted of a plain band; but the new pattern consists of a hammered ring, which can be had in various finishes. When lately visiting the show-room at No. 17, Farringdon Street, E.C., we noticed on view a pendant of a very simple pattern, designed for the kitchens, &c., of slot-meter consumers. This pendant is so arranged that an inverted burner can be suspended from the top, or an upright "C" burner fixed at the bottom. The opening from the pipe which is not required for use is closed by a screw cap, fitted with a small ring so that it is possible to attach the protector to it, in the event of an upright burner being used. The object with which this fitting has been prepared is to enable dealers to stock one pendant which can be utilized for either system of lighting at the option of the customer.

**Bray's Bijou Vertical Inverted Burner.**

**The "Duplex" Gas-Meter System.**—In the "JOURNAL" for the 15th inst., it was stated that the British patents covering the "Duplex" meter system of the Compagnie pour la Fabrication des Compteurs et Matériel d'Usines à Gaz, of Paris, who are showing at the Franco-British Exhibition meters constructed on this system, have been purchased by Mr. Frank Thorp, of Whitefield, near Manchester, for an English company. This has now been registered, under the title of the Alliance Meter Company, Limited, with a capital of £10,000, in £1 shares (4000 preference), for the above-named purpose, and to manufacture gas, water, and other meters and apparatus, &c. The first Directors are Mr. T. G. Marsh and Mr. Thorp; and the registered office is at 1, Mawson Chambers, Deansgate, Manchester.

# ROUND THE WORLD—AND SOME GAS-WORKS.

By Maurice Graham.

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## XI.—NEW ZEALAND (NORTH ISLAND) AND THE SOUTH SEA ISLANDS.

Rejoining the steamer at Lyttelton (South Island), a further voyage of two days and Wellington (North Island) was reached. This city is the capital of New Zealand, and is the oldest, but not the largest, town in the Colony. It was founded in the year 1840; and its population now numbers about 65,000. As will be seen from Photograph No. 97, it is finely situated, and has a beautiful harbour, well equipped with all the latest appliances for loading and unloading cargo. As many as six ocean-going steamers are often seen alongside the wharves, being loaded with wool, frozen meat, and other products for Europe. There is very little available level land; and consequently the streets are rather narrow, and do not show off the handsome buildings to the best advantage. There is, however, a peninsula on one side of the harbour, in which direction the town is rapidly extending—thus gaining a seaside resort within its suburbs. A system of electric and cable trams has been installed, and is being extended to surrounding places. The city is provided with gas and electric light; and there is an excellent water supply. So things are going ahead by leaps and bounds. It is the seat of Parliament, which at present is located in Government House, owing to the Houses of Parliament having been destroyed by fire some few months ago.

### Wellington (New Zealand) Gas-Works.

By a visit to the works of the Wellington (N.Z.) Gas Company, Limited, the writer learnt that there was a very large scheme of reconstruction being carried on. The existing gas-works were established in 1870; and the 2¾ acres on which they stand are now exhausted. A new site has, therefore, been purchased, 4 miles away from the present works. The new land covers 14 acres; and upon it an entirely new manufacturing station will be established. When completed, the old works will be closed, and all the gas will be made on the new site.

The Engineer, Mr. H. Birch, informed the writer that great improvements in all departments were being made, and that the latest design of apparatus was being introduced. The present gas-works yard showed signs of temporary additional plant being erected, among which was a Humphreys and Glasgow water-gas plant of 350,000 cubic feet capacity per diem. This will help to tide over affairs until the new works are in full swing.

The coal—which is New Zealand, from the Coalbrookdale mines at Westport—is carted from the steamer to the works; while from the stores to the retort-houses it is carried by an elevator and conveyor. The charging of the retorts, however, is done by scoops, and the drawing by hand. There are 26 regenerative settings (or 164 single retorts) in the two retort-houses. The coke, which is quenched from fixed overhead water-pipes, finds a good local market.

Of annular condensers, there are two sets, each of six columns; two of Dempster's rotary exhausters; a million cubic feet Livesey washer; and a scrubber, 8 feet diameter and 46 feet high. Oxide of iron is used in the six purifiers, of which four boxes are 18 feet square and two 25 feet.

The three gasholders contain 650,000 cubic feet; but the works' maximum daily make is nearly a million cubic feet, and the output for last year was 259 millions.

**Photograph No. 97.—General View of Wellington (New Zealand) and Harbour.**

The repairing workshops are fitted with machines ample enough to enable any small repairs to be done.

Turning to the bye-products, it was found that the ammoniacal liquor was concentrated, and shipped to Australia for use in the manufacture of anhydrous ammonia. Tar, as at other places, meets with a good sale—fetching 3½d. and 4½d. per gallon.

Most of the city is lighted by electric light, with which there is very keen competition—both sides employing canvassers to get consumers. The price of gas is 5s. 5d. for ordinary purposes, and 5s. for gas-engines.

There are 1800 slot-meters in use—1s. being the unit, for which 170 cubic feet of gas are obtained. Gas cookers and fires are in good demand, and play an important part in the increased consumption, which on the year amounts to 12 or 14 per cent.

### A Labour Dispute and Award.

The Gas Company have not been exempt from labour troubles and disputes with the Wellington Gas Stokers and Cokers' Union. Stokers were getting 9s. 3d. per shift of eight hours, while yard men are paid at the rate of 1s. per hour, and main and service labourers at 1s. 1½d. per hour. The stokers recently demanded 10s. per shift; but this was refused, and arbitration was resorted to. The award was given on April 11 last, and was to continue in force till April 13 next. A full week's work is to consist of seven shifts of eight hours per shift. A leading stoker to be paid not less than 10s. 6d. per shift and an ordinary stoker 9s. 9d. Upon all holidays, double time is to be paid. Not more than twenty retorts are to be drawn and charged per stoker in each shift. Accommodation is to be provided to the satisfaction of the Inspector of Factories to enable the workers to change their clothes and have their meals apart from the other employees. Lastly, the Union has to do all in its power to prevent any strike; and if there be one, it shall be *primâ facie* evidence that the Union has committed a breach of duty. The Court, in the event of a strike occurring, reserves the right to suspend the operation of the provisions of the award. All of this throws some light on the pretensions and conditions of labour in the New Zealand capital.

The recently appointed General Manager of the Wellington Gas Company is Mr. William Ferguson, M.Inst.C.E., who was formerly the Chief Engineer of the Harbour, &c., at Wellington, which he designed and built. His experience will be of great service in supervising the new gas-works, which will involve a large amount of excavation, surveying, and pier and dock construction. The design and development of the new works will be watched with interest.

### Palmerston North.

The writer's route lay north by train; and stopping at Palmerston North, he took the opportunity of visiting the gas-works and offices. The inhabitants of this town, which has a population of over 10,000, rely entirely upon their agricultural surroundings, and have great faith in the resources of the immediate neighbourhood. They have laid out their buildings in a uniform and extensive fashion. The Palmerston North Gas Company, Limited, also evidently believe in a future of rapid progress, and have built splendid offices fitted up in the latest style (see Photograph No. 98). They contain show-rooms, gas-fitting and stove departments, with meter and general shops adjacent. The Secretary's and Manager's office is in the same building at the centre of control.

Mr. Kennedy, who received the writer with a good hearty welcome, has had sound practical experience in the Old Country. Formerly, he held an important position with Messrs. J. & J. Braddock, of Oldham; and after going through the branches of their works, he spent several years undertaking the erection of gas plant all over the world. It was while he was in this Colony that

**Photograph No. 98.—Palmerston North Gas Company's Offices.**

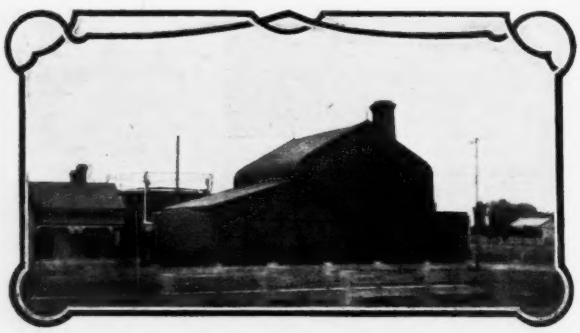
the Directors of the Palmerston North Gas Company offered him the position of General Manager of their concern.

Mr. Kennedy has advanced ideas upon gas questions, the two most important of which he believes to be, "How to increase the sales of gas" and "How to burn it." These are the two points to be aimed at; and to these he pays the greatest attention. He has, therefore, induced his Directors to build the large offices and show-rooms (seen in the photograph) in the most conspicuous part of the town. This gives the Company as great credit and stability in the eyes of the public as does a bank edifice with its customers. He has decided to be the first in, and prevent the adoption of electric light; and he is using every endeavour, device, and method (originating in whatever country) to accomplish this end. The Directors have in Mr. Kennedy the very man to have given a good foundation to their undertaking, and to carry on its successful career.

A visit to the gas-works showed that large improvements and extensions were being made to the plant. The erection of high scrubbers and the scaffolding adopted for it are seen in Photograph No. 99. Of the gasholders, one is on the spiral-guided system. Everything about the works was in apple-pie order, and evidenced efficient management.

### Fielding.

The little town of Fielding (of 3000 people) is becoming one of the most important towns on the west coast. It is the centre of a fine district and is the outlet of a large hinterland. It is a dozen



**Photograph No. 100.—General View of the Fielding Gas-Works.**

miles only from Palmerston North, and about a hundred from Wellington. The writer paid a short visit to it, and had the pleasure of meeting Mr. Healey, the genial Manager of the local gas-works, a general view of which is reproduced in Photograph No. 100. Mr. Healey, after gaining useful and considerable experience in constructional work, came to Fielding from the Dunedin Gas-Works, described in the previous article. At Fielding, there is every prospect of his neat little works growing rapidly, in keeping pace with the development of the surrounding district.

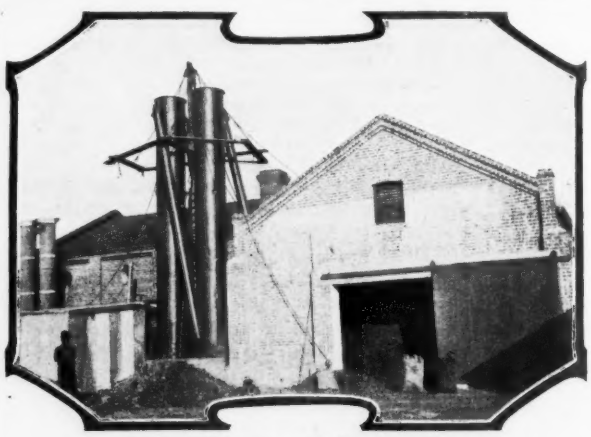
Proceeding north by railway, great tracks of country are passed through, which are part of the large sheep-runs of the North Island. The railway trains do not exceed a speed of 20 miles per hour, and stop at all towns and villages. The narrow-gauge is the one adopted. The whole of the country has once been forest or bush, which the early pioneers and settlers have cleared for the sheep-holder or farmer.

### Wanganui.

Wanganui is a small, thriving town situated near the mouth of the river of that name. It is the oldest town after Wellington, from which it is 150 miles distant by rail. It is entirely dependent upon agriculture for its prosperity; but according to local accounts, it will not be long before it ranks equal in importance to the larger towns of the South. A great amount of fruit is exported from here to England by a direct line of steamers.

After a general look round the district, the writer's eye caught sight of a large red brick building, which stands out conspicuously in the main thoroughfare. It proved to be the Corporation Gas Offices, and is seen in Photograph No. 101. After an interview with the Manager, Mr. G. D. Stone, who was superintending some alterations to gas-mains consequent upon the adoption of electric trams, an inspection was made of the show-room and offices. The latest appliances from home were just being rapidly unpacked, and placed in the show-room, through which everybody must pass to reach the general office and pay-counter. Adjoining are the meter-rooms, gas-cookers and general fitting and repairing shops. The Gas Committee must be complimented on taking their Manager's advice as to building substantial premises in the centre of the town, so as to push the sale of gas prior to the introduction of the electric light works. It may be noted that electricity works can always easily be started owing to the plentiful supply of timber, which provides a cheap fuel.

The gas-works are about a mile-and-a-half from the office; and upon approaching them the writer could see they were in a state of reconstruction. It would not serve any purpose to describe them as they then were. The new retort-house and coal-stores will add considerably to the carbonizing capacity of the works, which now turn out 60 millions a year, and a maximum daily make of 275,000 cubic feet. All the present eight beds of retorts are heated by regenerative furnaces. Mr. Stone was altering the



**Photograph No. 99.—Erection of Scrubbers.**

arrangement of the hydraulic main and tar overflows, as the fittings of the existing bench (which had been erected by an English firm) had not given satisfaction.

All the stoking is done by hand. A leading stoker gets 10s. per day of eight hours; others receiving 9s. 6d., together with an annual holiday of ten days on full pay. Bricklayers receive 13s. 4d. for eight hours, and retort setters 15s.

The new exhauster-house has the making of a nice, neat building; but the purifier-house, built before Mr. Stone's arrival, is rather a heavy brick building for a ground-floor house.

The last new gasholder, of 160,000 cubic feet capacity, stands in a concrete tank designed and built by Mr. Stone, who has had experience with this class of work in the Colonies. This particular tank was perfectly cylindrical, and not the slightest trouble was experienced by the local firm who erected the holder. Their work would certainly do credit to any English firm of gas contractors. Another holder is of 100,000 cubic feet capacity; and there is a small spiral one of 25,000 cubic feet.

On the land owned by the Corporation, and coming within the gas-works area, is a firm of spiral steel-pipe makers, who have been very successful in introducing such pipes for gas and water purposes both in Australia and in New Zealand. The pipes are made of strip sheet steel, and are riveted. According to all

**Photograph No. 101.—Wanganui Corporation Gas Offices.**

**Photograph No. 102.—The Main Street of Auckland.—The Incandescent Gas-Burners are Arranged in Pairs.**

accounts given the writer, they have afforded every satisfaction. There is a 20 per cent. duty on all pipes under 6 inches diameter, and upon all gas apparatus imported into the Colony.

After bidding adieu to the Engineer, the writer started by steamer from Wanganui to Pipiriki, some 57 miles up the river. The scenery is magnificent and unequalled—banked by high precipitous hills and perpendicular walls of rock. The prolific growth of ferns is remarkable. New Zealand should be called "the fernery of the world." The climate of the northern island is neither hot nor cold; the winter being mild like an English spring. From Pipiriki, where there are no gas-works, the coach was taken for another 50 miles to Ohakune, which is merely a collection of a few wooden huts. The route lies through dense forest, and one realizes the hardships that a "new chum" has to go through. Thence by train to Waiouru—merely a resting and coaching place; then by coach to Tokaanu, where the famous hot-springs and boiling lakes are to be seen. Thousands of wild horses were passed, and an every-day occurrence is to see the native Maoris cooking their food in the hot earth and boiling pools provided by Nature.

Crossing Lake Taupo, and reaching the place of that name, a veritable wonderland is reached—mud volcanoes in action, geysers throwing up boiling water and steam to a height of 50 feet, blow-holes, and boiling pools. Trout can be caught in cold spring river water and boiled in boiling pools within three feet of the place of capture. At Wairakei, the centre of the thermal region, are the great geysers throwing up boiling water 80 feet high at regular intervals of 30 minutes. Here also are the coloured lakes—scarlet, red, green, blue, chrome, and black—each lake with a separate colour from minerals held in solution. One steam blow-hole is 2 feet in diameter, ejecting a continuous volume of steam at a pressure of 140 lbs. per square inch to a height of 50 feet. This is known as the safety-valve of New Zealand North Island. After visiting many other marvellous sights and thermal phenomena, the journey was continued from Rotorua to Auckland.

### Auckland.

The City of Auckland is one of great importance, and has one of the finest harbours in the world. It lies on a narrow isthmus, and is washed by the sea on both the east and west sides. It was once the seat of Government and the capital of the Colony. It has now a population of about 90,000 persons. There is a splendid water supply, equal to more than the average daily consumption amounting to 4 million gallons. The city is substantially built, mostly of cement buildings. Its streets are well-paved and lighted by incandescent gas-burners. These, as shown in Photograph No. 102 of the main street, are arranged in pairs on one lamp-post and are both efficient and effective. Photograph No. 103 illustrates the town offices of the Auckland Gas Company, Limited. As for their gas-works, these have already been described in the "JOURNAL" at some length (see Vol. C., pp. 169 and 237) and nothing more at present need be said. Mr. James Lowe is now the Manager in place of Mr. Suggate.

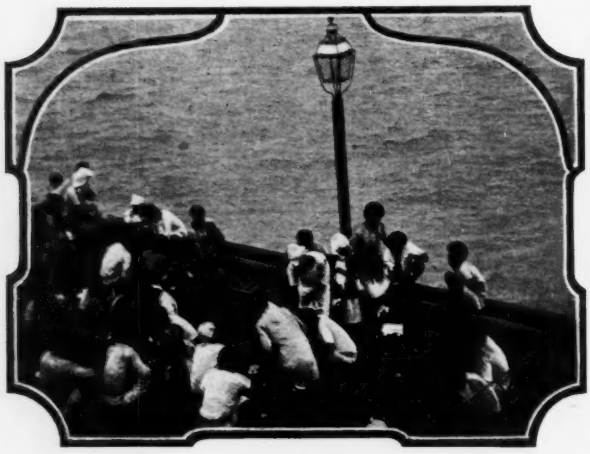
**Photograph No. 103.—Offices of the Auckland Gas Company.**

**Photograph No. 104.—"The Haamunga," Tonga.—A Trilithon of Solid Coral, 25 feet high.**

### In the South Sea Islands.

From Auckland, the writer sailed in the s.s. *Atua* for a trip round the South Sea Islands of Tonga, Samoa, and Fiji. The journey to and through these islands of "three wonderful nations," was full of interest and adventure; but gas and gas-works were not among them. However tempting, therefore, it would be to describe the attractive delights of these alluring and world-famed islands of the Southern Pacific, the writer must reserve an account of the weird native war dances; the walks and rides through the wild fruit-laden groves of orange, lemon, melon, pineapple, and many other varieties; the copra, cocoa-nut, and banana plantations; the maze of innumerable coral reefs and islands; the grandeur of Savaii, in active eruption since 1905 and still pouring out into the sea its thousands of tons of red-hot lava amid frequent electrical discharges; the Samoan dances; the visit to Robert Louis Stevenson's home at "Vailima," and the stiff climb to his tomb 500 feet above; and the fascinations of Fiji—all these must for the present be passed over. But a curious puzzle of erection may be mentioned and photographed (No. 104). "The Haamunga" (Tonga) consists of three immense blocks of solid coral, one laid at a height of 25 feet across the other two, and lying in large sockets cut to receive its two ends. The top block is 20 feet long by 5 ft. 6 in. deep and 5 feet wide. It was built by an extinct race of Tongans; but how was it lifted into position?

Also the writer may mention the fact that the landing stage at Levuka (Fiji) is quite a presentable structure with a system of narrow-gauge railway for carrying copra; and that the stage is lighted with acetylene gas, which makes it a bright little spot. In Photograph No. 105, Fijians are seen having a meal under the acetylene lamp-post.



**Photograph No. 105.—Acetylene Gas-Lamp on the Landing Stage at Levuka (Fiji).**

After a memorable and unique trip, the steamer was joined for a voyage of five days to Sydney, New South Wales.

## A NEW RETORT-HOUSE AT BOLTON.

THE new retort-house which has been constructed at the Lum Street works of the Bolton Corporation was officially opened last Friday by Alderman Leonard Wild, the Chairman of the Gas Committee. The old house, which was erected some fifty years ago, was 185 feet long and 132 feet wide, and covered with three roofs, which were very low and most unsuitable for the present demands. The new one is 185 ft. 9 in. long and 136 feet wide, covered with two roofs, and is built high and well ventilated. We give an illustration of the roof during erection. It is of special design, on the primary and secondary principle, and is constructed to carry a dead-load of 15½ tons on each main principal, and bear a wind pressure of 12 tons—making a total load of 27½ tons. The foundations of the stanchions supporting the roof in the centre of the house are designed to take a total dead-load of 1 ton per superficial foot. From these stanchions it is intended at some future time to carry two continuous coal hoppers, having a capacity of 180 tons each. The total weight of steelwork in the roof and stanchions is 242 tons. The number of slates used was 30,000, weighing 120 tons; and the copper wire clips employed for securing them to the laths weighed 14 cwt. To cover the iron-work with two coats of paint, 6¼ cwt. of paint, 56 gallons of oil, 12 gallons of turpentine, and 1½ cwt. of driers were required.

The interior of the building is most imposing. The principals of the roof stand out bold and clear, well above the 576 retorts which they cover. The old retort-house was taken down without interfering in any way with manufacturing operations; and great care and skill were necessary to support temporarily the many mains conveying the gas from the house. The quantity of excavation required for the foundations was 811 cubic yards; the foundations themselves being formed of 263 cubic yards of concrete. The walls up to the bottom plinth are 3½ bricks thick; and the number of bricks used was 580,000 (all of local make), which required 600 tons of mortar.

The whole of the work was executed by local contractors—the brickwork, &c., by Mr. William Gornall, and the steelwork by Messrs. John Booth and Sons, both of Bolton, to the designs and details prepared by the Gas Engineer and Manager (Mr. William Smith) and the Assistant-Engineer, Mr. Sidney Smith, who also superintended the erection of the house, and, in addition, filled the position of Deputy Gas Engineer and Manager during the three months' leave of absence which Mr. William Smith was forced to take on account of his health. The work has been carried out in a very substantial and workmanlike manner, well within the specified time, without any extras at all (the actual cost being below the estimate), and without accident. The whole building is most creditable to all who have had the matter in hand; for they have erected a retort-house which will stand for many years as a testimony to the good workmanship that can be done in Bolton.

**Bolton Corporation Gas Department—Lum Street Works. New Retort-House Roof during Erection.**

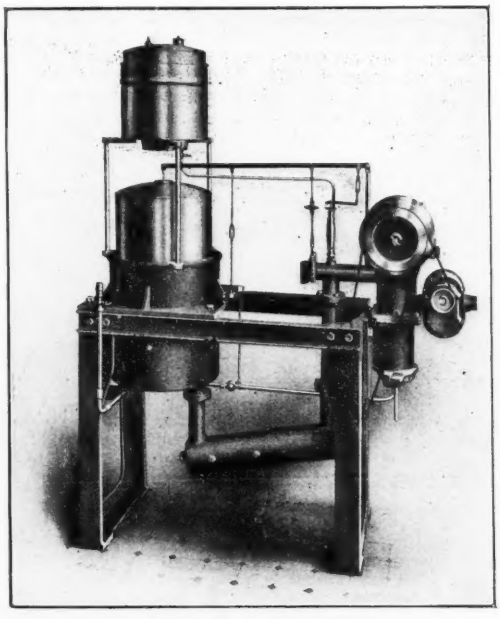
### A High-Pressure Gas-Main at Mülheim.

A recent report issued by the Municipality of Mülheim-on-the-Ruhr states that it has been found convenient to introduce a high-pressure gas supply for a number of suburbs. A faulty supply in winter time was complained of in some of these; and in one adjacent district there has been much extension of building. Consequently, the main leading to this district was arranged so that the gas supply now takes place under holder pressure in the daytime; but in the evening hours a compressor is brought into use which forces the gas into the main at a pressure of upwards of 80 inches of water. At a certain point, the main bifurcates; and a district governor is put in to control the pressure on the small branch. The principal branch goes on to other districts, where ultimately the pressure is controlled in a governor station constructed under the roadway. This is believed to be the first instance of an underground governor station in Germany, and probably anywhere on the Continent.

**Midland Association of Gas Managers.**—We learn from the Hon. Secretary (Mr. Charles Meiklejohn, of Rugby) that the autumn general meeting of the Association will be held at the Grand Hotel, Birmingham, on Thursday, the 22nd prox., at 2.30 p.m.

## COX'S AIR-GAS SYSTEM.

It is now nearly eighteen months ago that special attention was directed in these columns to the revival of air-gas systems, which was mainly attributable to the spreading acquaintance with the properties of light petroleum spirit. At that date, several methods of utilizing petrol for this purpose had been developed; and there have been additions since. The plants that had been designed were practical in character, and were regarded, from the scientific standpoint, as wide asunder as the poles from the primitive air-gas methods of a past day. During these eighteen months, so far as our observation has gone, there has been no published intelligence of accident with such plants; and, in fact, nothing has occurred to hinder their adoption in the field for which they are specially adapted—that is to say, for the supply of gas for lighting and other purposes to dwelling-houses and to premises isolated from the ordinary gas-supply mains. As a matter of fact, these simple plants, demanding comparatively little attention, have been veritable thorns in the sides of those electrical manufacturing firms who have laid themselves out particularly for the installation of small independent electric-generating plants. When consideration is given to the relatively small cost of these new air-gas plants, the degree of efficiency to which they have attained, the low maintenance charges, and the fact that skilled attention is not required for their operation and care, it is clear that independent electric lighting plants stand small chance against them where economy and not extravagance is the determining factor in choice of system. That a measure of commercial success is attending the exploitation of these systems is also attested by the sustained interest of inventors in the subject, by the fresh introductions, by the improvement in the efficiency of some of the older systems, and by the ample provision made for their manufacture.



**The Cox Air-Gas Plant.**

When our special article on "The Air-Gas Revival" was published on April 30 of last year, the basis of much of the comment was the Cox air-gas system, of which we spoke as being among the best known at that time. Since then, there have been advances made in the system as a whole that have improved working and the efficiency of the gas as a lighting agent; but principles remain as formerly. The plant consists simply of a small hot-air engine (operated by the gas it produces), a gasholder, a petrol container, carburettor, and blower all mounted on an iron stand. The air-engine is started by hand; and when sufficient gas has been made to feed the gas-burner under the engine, the process of gas-making, so long as there is petrol in the container, proceeds automatically; the regulation for the petrol feed to the carburettor and the working of the hot-air engine being governed entirely by the draft upon the gasholder. The gas is distributed from the holder in the ordinary manner. The plant is made in various sizes from 25 up to 150 lights, and beyond this if desired; but the small ground space occupied is shown by the fact that a 25-light machine only takes up about 36 in. by 15 in. overall.

In the making of the gas, the proportion of petrol vapour to air used some eighteen months ago was about 2 per cent.; but we now learn that the proportion has been reduced to 1·4 petrol vapour to 98·6 air. This is a material gain in economy, and, as will be shown presently, without any loss, but rather otherwise (using an improved inverted burner for the purpose), in efficiency as a lighting agent. Inverted burners, it may be said in passing, have done much in enhancing the lighting value of air gas. When the proportion of petrol vapour used in the gas was 2 per cent., it was pointed out in these columns that it would be necessary for the ratio of petrol vapour to be appreciably above 2 per cent. before an explosive mixture would be formed; but there is further recession from the explosive point by getting down to the 1·4 per cent. Of course, there has to be acceptance of these figures from the makers without any opportunity of verification on a continuous run. The constancy of the quality of the gas has also to be taken as true from the assurance of the inventor. The regulation of both petrol and air delivery is, as mentioned previously, governed entirely by the demand for gas. It would appear that other circumstances—temperature, the condition of the atmosphere, and the quality of the petrol—might come into play to affect the equality of production; but the inventor says not. The petrol simply drips, in its regulated quantities, into the carburettor, where it spreads into a film, and the air at once absorbs the spirit. It is pointed out that there is no condensation, or any separation of the mixture.

The reduction in the proportion of petrol to air, without (on the figures given) reducing the efficiency for incandescent lighting purposes, has, of course, increased the yield of gas per gallon of petrol used. Eighteen months ago, with 2 per cent. of petrol, 1250 cubic feet of gas were produced per gallon of benzol; now about 1400 cubic feet is the yield. The consumption of the bijou form of incandescent burner then used was 10 cubic feet each per hour; the reputed efficiency being about 10 candles per cubic foot, or 100 candles per burner. Consequently, a gallon of petrol was equal to the maintenance of ten burners for twelve-and-a-half hours. Now 1400 cubic feet are made per gallon of petrol; and here we come to a further advance. Mr. Cox, the inventor of this particular air-gas system, has also produced a new inverted burner for the use of the gas; and this burner only takes 8 cubic feet per hour, and its efficiency is stated to be 15·6 candles per cubic foot, or 125 candles per burner. Consequently, ten burners (giving 25 per cent. more lighting duty than formerly) can now be maintained for 17½ hours on a gallon of petrol, as compared with 12½ hours formerly. The new burners have a nickel-wire gauze right on the nozzle; and the nozzle itself is made of a special alloy, to prevent melting. The tube of the burner (no secondary air supply is admitted with air gas) is plain quite through; and the gas-nipple itself is in the form of a plug with a plain flat end, and the holes for the passage of the gas into the tube are round the plug at the sides. Ordinary bijou mantles are used.

From these figures, excepting the costs of installation and maintenance, it is fairly easy to calculate (knowing the cost of petrol) the running expense for lighting purposes. Petrol, as is known, has gone up in price. When last we were making calculations regarding the Cox system, the price was about 7d. per gallon; now 11½d. is being paid, and rather more in outlying places. The Chairman of the Cox Air-Gas Company tells us that petrol delivered at his house at Walmer costs 1s. per gallon; and he has about 36 lights on this system running there. The plant has all the attention that it requires from one of the maid servants; and for nine months it has been running without giving the slightest trouble.

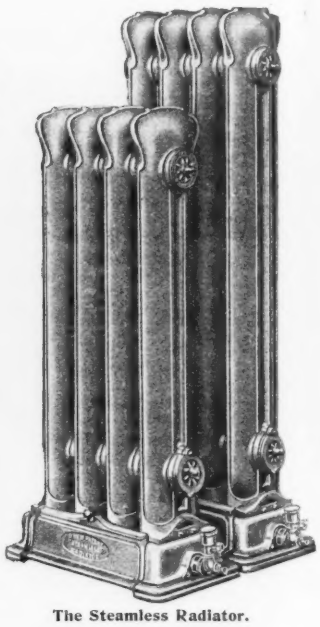
Although petrol air gas is non-explosive, there is, of course, danger in the petrol itself. But the knowledge of this fact has no doubt made people cautious. Hence the absence of reported accidents. The Company inform us that they have not the slightest difficulty in now getting the plants passed by the insurance companies. The mixture is said to be inodorous after combustion, and to be in no way dangerous to health. But, as a matter of fact, a slight odour is discernible when there is an escape of gas before combustion.

Yesterday week there was a demonstration of the plant, at the works where it is manufactured in Camden Town, to show the improvements. Several completed plants of the various sizes were on view; and numerous inverted burners were in use, displaying mantles richly incandescent, and giving an excellent and steady light. Radiators were also seen in use, the running expense of which is put at 1d. for ten hours; and one consideration that the inventors speak well of is that no flue is required. Certainly, from the one inspected there was no perceptible smell. A griller was also seen; as well as a laundry machine, with its rolls heated by the air gas; and a specially made blowpipe, by means of which copper wire was rapidly fused. With regard to the use of petrol air-gas for heating purposes, we think it may be said that, in the article in the "Journal" for April 30 last year, it was conclusively proved that the petrol air gas could not compete with coal gas in this respect. But, of course, it is generally conceded that the field for these plants is off the tracks of an ordinary gas-distributory system, where the price is of moderate amount and gas is always on tap without the initial expense of a plant, and without any thought of having to provide petrol and a place of safe storage, and of worrying about attention to the plant. The plant has to be started by hand each time the lights are used, until sufficient gas is produced for the burner under the hot-air engine; and this burner has to be extinguished before being left for the night, unless it is allowed to run all night, when it only makes sufficient gas to drive the machine (unless other lights are turned on). This is done in many cases. In rural districts, however, where there is not a supply of ordinary gas, the best of such plants can—common care being exercised—be heartily recommended. They will give far better value to the user than an independent electricity generating plant. They cost less, do not require any skilled and constant attention, and the maintenance expenses are low.

## DAVIS GAS-STOVE COMPANY'S NOVELTIES.

An excellent display of gas-fires, cookers, and other appliances is always to be seen at the Queen Victoria Street show-rooms of the Davis Gas-Stove Company, Limited; but a call there on the approach of the cold season may be made with the confident anticipation of finding something new in the way of gas-heating apparatus. The present occasion is no exception to this rule; improvements are to be seen in several directions. Perhaps mention may be first made of the firm's new steamless radiator, which is the outcome of a great deal of time and thought; some two years having been required for the experiments which have resulted in bringing it to its present form. Of this, great things are expected. Certainly its appearance is in its favour, for it is highly finished, and of very pleasing design. But this in itself would not, of course, be sufficient to secure for it the popularity which the manufacturers are confident that it will secure. More substantial qualities than good looks are required in such a utilitarian appliance as a gas-radiator; and of these it is claimed that the apparatus now referred to possesses a very large share. The chief advantages of the steamless radiator are, we gather, absolute simplicity and economy. The latter will please the consumer who pays the gas bill; while the knowledge that there is no necessity to touch the radiator, should appeal strongly both to the user and to the gas supplier. To explain these points, it may be remarked that this form of radiator has no automatic valve, and no fittings whatever, with the sole exception of a patent governor. The automatic gas-valve is rendered unnecessary because no extra gas is required to obtain the maximum temperature; the gas consumption being maintained at one amount from the time of lighting up. For example, it may be said that the average gas consumption of the ordinary 39-inch four-loop gas-steam radiator, after a maximum temperature is obtained, is reduced to 8 cubic feet per hour; whereas the consumption of the 39-inch four-loop steamless radiator is 8 cubic feet per hour from the time of lighting up, although it is stated that the maximum temperature is secured in the same time, and there is an equal heating capacity. The radiator has an even temperature over the whole of the tubes; the top and bottom being apparently of the same heat. Other advantages claimed for this form of radiator are its ease of adjustment; the possibility of obtaining quite a variety of effective temperatures instead of one; the absence of smell, there being no flame contact; and the fact that it is so constructed that it has no drying effect on the atmosphere. The "sweet simplicity" of the steamless radiator—with it there is nothing whatever to do, except merely light the gas—should render unnecessary the sending out with it of any card of instructions.

Davis's "No. 68" Fire.



The Steamless Radiator.

Turning attention to the gas-fire section, it is pleasing to learn that so much success was experienced by the Company with their two Adam design fires last year, that they are this year adding another of these patterns to their list. The newcomer—called the "No. 68"—is an excellent canopy fire, with reflector fender (which the Company used last year) and also a heating chamber. The moderate price at which this fire is to be sold may fairly be expected to aid the demand for it which the makers are looking forward to. Finally, a brief reference may be made to the "St. Michel" series of stoves, which are more especially designed for shops and other places where it is not possible to fit a flue, and where a cheap and effective heater is required. In appearance, these stoves are all that can be desired; and they are well adapted for the purpose for which they are intended.

## SOME NEW AND ARTISTIC FIRES.

The new patterns of gas-fires which Messrs. Fletcher, Russell, and Co. are placing upon the market to meet the coming season's demands are well calculated to fully maintain the reputation which the firm have long enjoyed for the artistic character of their goods; and, moreover, the designs are varied so as to meet all requirements. In the first place, for those who desire to avail themselves of this attractive style of heating, there is the "Saxon," which is a new and original design of dog-grate fire. The three styles in which it is being made are illustrated; and it will be seen that one is without, and another with, a backpiece; while the third is fitted with an overhanging canopy. They are finished in coloured majolica enamel, and fitted with the firm's patent non-lighting-back burner. The fire opening is 12 inches wide, so that they are suitable for heating rooms up to 16 feet square.

The "Saxon" Dog Grate Pattern Fire.

Next there is the "Oval" fire, the form of which is described by its name. It has been designed on new lines, with the view of meeting the requirements of that very large class of people who are on the look-out for a fire which, besides being exceedingly moderate in first cost, is efficient and consumes only a small quantity of gas. It is fitted with an air and gas adjuster, and is intended for use in rooms up to 14 feet square. Among the most popular of the firm's patterns already in use is the "India" gill fire; and the general satisfaction given by it has induced them this year to introduce another stove designed on similar lines, which has been named the "Africa." It is made in two sizes, suitable for rooms 20 feet and 25 feet square respectively. The "rising generation" have not been forgotten while preparing the new models, inasmuch as a cheap pattern nursery fire—the "Riviera"—has been introduced, for use in rooms up to 14 feet square. This fire has an air and gas adjuster; and the provision of a boiling-burner on top enables it to fulfil a double purpose. Another elegant pattern gas-fire which deserves mention is the "Jersey." In conclusion, it may be pointed out that all these fires can be had finished in stove enamel or majolica colours; and they are fitted with patent non-lighting-back burners.

The "Riviera" Nursery Fire.

Messrs. Fletcher, Russell, and Co. have always made a speciality of gas-fire recesses and chimney pieces; and no one who has visited their show-rooms can have failed to be struck with the

beauty of the many designs that are on view. In conjunction with any of these, the use of a "Palmyra" fire produces an effect which should completely satisfy even the most fastidious. This fire,

The "Oval" Fire.

The "Africa" Fire.

fitted with non-lighting-back burners, is arranged to fit into 36 or 38 inch interiors; and it can be had with bright brass or copper or antique copper repoussé casings.

## CHIPPERFIELD SELF-COMPRESSING GAS-LAMP.

WELCOME is given in these columns to anything that tends to simplification in the efficient utilization of gas for illumination or other purpose; and therefore welcome is accorded to a lamp which will, for commercial purposes, be known as the "Chipperfield," and the joint patentees of which are Mr. E. S. Cook and Mr. W. H. Chipperfield. This lamp has been dissected for the purpose of this notice at the office of Mr. C. E. Masterman, of No. 28, Victoria Street; and its working and illuminating efficiency has been under examination at No. 17, Hanway Street, off Tottenham Court Road, the address of the Cook Gas Engineering Company, Limited. The idea of utilizing the waste heat given off by a burner by converting it into mechanical energy for the compression of air or gas for supply to the burner—thus constituting each lamp its own independent compressor—is not by any means new; but the features that have been successfully striven after in this lamp are simplification, reliability, and durability in putting the principle of self-derived pressure into use, and that at comparatively low cost, and in a form that allows impairment produced by service to be dealt with readily, by any intelligent gas-fitter, at quite modest expense. In Mr. Chipperfield we find a practical engineer, whose interests have been largely centred in the development and production of laundry machinery; and it is in connection with this machinery that he devised an air-compressor which has given an excellent account of itself for longevity and efficient operation. His experience with this led him to apply it to a gas-lamp; his opinion being that what was wanted was a self-compressing lamp, free from mechanical delicacies, which would commend itself to practical men as a practical and efficient structure.

In brief, what Mr. Chipperfield does is to heat and compress air and supply it, under regulated pressure, to the lower part of the bunsen tube of an incandescent burner. The means by which this is accomplished are beautifully simple; and yet, should any unforeseen mishap occur to a lamp during lighting hours, it would not—this is one point that needs to be emphasized—be extinguished, but would simply continue shedding a reduced light. Simplicity, maintenance of efficient working, and ease of renovation are the points that immediately compel attention and admiration on dissecting one of the 500-candle power lamps for examination. The crown of the lamp is rapidly removed; and it is found to cover the upper portion of the operating parts (mechanism is too big a word for such simplicity), which constitute the central feature of the lamp. A nut connection to the compressed-air supply-pipe leading to the air-reservoir enables the whole of the operating parts to be removed in a single body. This, for the 500-candle power lamp, is quite a small affair. The cylindrical vessel is only about 5 inches diameter and 1 foot long, and with the head portion only 18 inches overall. Thus, it will be seen that its incorporation in a high-power lamp has no serious effect upon its height, as the cylindrical body seats well down to the reflector, and the bottom is only just above the mantle; while the upper part finds accommodation in the ordinary ornamental finial to outdoor lamps of the larger sizes. The small dimensions of this operating part must be borne in mind in reading the description of the invention, so that separate mention of the various parts will not lead one into the mistaken notion that here we have a cumbersome and complicated piece of mechanism. The body of the mechanical compressing arrangement (which is practically a hot-air engine) is called the container. There is an outside casing with a copper bottom on which the heated products of combustion play. This outer cylinder contains an inner shorter movable one, on top of which is a bellows, of concertina construction. The bellows form a very small part; but importance is not to be measured in this instance by size. They are ingeniously constructed of circular sheets of brass, the joints being made in such way that the mechanical wear upon the metal is reduced to the minimum. The bellows are attached at the bottom to the inner cylinder, which freely moves up and down in the outer casing. Through the bellows, and connected to the inner cylinder, runs a rod, which at the top connects with a small spring (made of piano wire), suspended from a fixture that rises from the top of the cylindrical body. Now by expanding and contracting the flexible metal bellows, practically the same effect is secured as when a piston is being worked in a cylinder. By each complete operation, air is displaced and air is admitted.

There is a central opening in the upper end of the outer cylindrical casing closed by a cover to which are connected inlet and outlet valves. The outlet-valve communicates by a pipe with a storage reservoir (formed in, and as part of, the lamp body itself) for the compressed air; and this is provided with a simple governor for controlling the pressure of the air supplied to the burner—a convenient pressure being 36 inches—as well as with a safety-valve. The inlet-valve forms the channel communicating between the atmosphere and the interior of the extensible and compressible body which we have been referring to as the bellows.

Before describing the action of this simple piece of mechanism, there is one important part yet to be noticed. The rod communicating between the inner cylinder and the top spring carries arms from the ends of which depend cylindrical slide-valves, which are attached to the outer cylinder. These valves have a diaphragm in the centre, above and below which are ports, which are opened to the atmosphere at each end of the stroke. The original illustrations accompanying the patent specification only showed one of these slide-valves; but among the improvements effected since are the adoption of two valves, which have, among other beneficial effects, produced complete regularity in working, as well as frictionless movement. The whole of the parts are now described; and their simplicity will have been apparent.

Regarding the actions produced on the lighting of the burner. The heat playing on the lower end of the apparatus expands the air in the outer chamber, and thus increases its pressure. This causes the metal bellows to contract, so raising the inner cylindrical body, and simultaneously the slide-valves. This movement continues until the upper ports in the slide-valves are open to the atmosphere, when the expanded air in the outer chamber escapes. The pressure of the outer chamber having in this way been reduced, the inner chamber commences to fall by gravity; thus causing the expanded air at the bottom and heated end of the chamber to pass upward between the inner and outer chambers to the cooler ends, where contraction takes place, creating a partial vacuum, and enabling the further downward travel of the chamber to be continued until the ports in the slide-valves, which have followed the movement of the inner chamber by the action of the spring, again open communication between the outer chamber and the atmosphere. A fresh supply of air is in this way admitted to replace the air previously released. The motion imparted to the bellows causes them to act as a pump, by which air from the atmosphere is drawn into them through the top inlet valve, and expelled to the outlet valve at increased pressure to the storage receiver. This is all; and these movements and operations recur in regular cyclical order. It will be readily seen that it would be a simple matter to adapt the arrangements to the function of gas compressing.

In the lamp seen in use, from the lighting-up of the burner the pumping action commenced in about 45 seconds, and soon attained to a maximum of about 110 strokes a minute, when a pressure in the storage reservoir of 36 inches was, with the merest movement of the pressure-gauge, maintained. The operation, when once the working had settled down to normal, was smooth, and extremely pleasing to witness.

A few words about the burner, and the effect. At the base of the burner where the usual gas-nozzle is found, there is a special one, containing five apertures—the four outer ones being for gas, and the central one ejecting independently the compressed air into the encircling current of gas—the delivery into the bunsen tube being in the proportion of about 20 cubic feet of compressed air to 16 cubic feet of gas. Of course, the bunsen, as usual, takes in a further supply of air from within the lantern. The Voelker Mantle Company have been giving special attention to producing a mantle suitable for the lamp; and the one seen in use looked strong, and capable of good service. It is about 6 inches long, and of a diameter about that of ordinary high-pressure mantles. It was incandescent in every part; and the claim of the inventor to a light of 500 candles from the single mantle is fully confirmed by the report of Professor Silvanus P. Thompson, F.R.S., which is appended to this article.

The principal aspect, next to efficiency, of a lamp of this kind into which inquiry will be made is as to whether or not it is likely to fall in its moving parts into rapid and frequent disorder. The points may be quickly summed up for consideration. The bottom of the cylindrical casing, which is the only part subjected to heat, is of copper. The small bellows are constructed of brass, and in a manner that has rendered a good account in compressing work for laundry machinery; and these bellows, it will be noted, are at the cooler end of the cylinder. The top spring is of the best piano wire; and the resistance to the enormous strains to which such wire is exposed is well known. The spring can be replaced in a couple of minutes. The slide-valves have nothing passing through them but air; and these can be taken out and cleaned

when necessary in almost as quick time as it takes to say so in writing. The adjustments are all so simple that even the tyro in these matters could become familiar with them in a few minutes. The compressor arrangements are in one complete body, and can be taken out of the lamp entire by merely unscrewing a single nut on the air-delivery pipe; the whole being held in position by three clips. Everything has been worked out, and a complete and efficient structure effected, on practical lines; and a structure hardy enough to stand all the austerities—climatic and manual—to which outdoor lamps are exposed. The faith of the Chipperfield Lamp Syndicate in their new production is manifest by the fact that they are willing to undertake the maintenance of the lamps for £1 a year apiece.

REPORT ON THE LAMP BY PROFESSOR SILVANUS P. THOMPSON.

Professor Silvanus P. Thompson, F.R.S., has subjected the lamp to tests; and we have permission to publish his interesting report. It reads:—

In accordance with your instructions, I have had the Chipperfield lamp for observation and test in my laboratory, and now beg to report to you the principal results.

The Chipperfield lamp is a high-power incandescent gas-lamp, using ordinary coal gas at the ordinary pressure of the mains. It burns the gas in an atmospheric burner, in which the requisite high temperature smokeless combustion is attained by injecting into the burner warm air compressed automatically in the lamp itself. The hot flame so produced plays upon a mantle as in other high-power gas-lamps, and raises it to incandescence. The chief novel feature of the lamp is the automatic device, in the top of the lamp, which compresses the air by utilizing the heat of the lamp itself. This device is extremely simple, and constitutes, so far as I am aware, an entirely new feature in gas-compressing devices; being, in brief, an extensible metallic chamber constructed on the principle of the concertina, which rises and falls automatically—acting, in fact, like a pump without a piston, working frictionlessly.

So soon as the gas in the burner is lit, the ascending hot air begins to warm the tube or chimney, in which the automatic device is hung; and the latter, being thus warmed, begins of itself to pump the air into the burner. In my tests, the time taken for the lamp to come up to full candle power never exceeded 100 seconds. In my tests, the automatic device worked well, rising and falling with extreme regularity about 92 times in the minute. A metallic container in the top of the lamp serves as a reservoir for the compressed air, and regularizes the pressure at which it reaches the burner.

It will be seen that this invention differs completely from those in which the gas is put under pressure; and it requires no separate compressing machinery or special piping, since each lamp has its own simple independent compressing device in the top of its own lantern. The moving part is suspended free on a spring; and the temperature to which this is raised is quite moderate, being well below the melting-point of solder, so that the spring retains its elasticity.

I have made several series of photometric tests, under different conditions. In the following series, the mantle employed was one manufactured by the Voelker Lighting Corporation, of nine-lock quality. The gas was taken from the mains of the Gaslight and Coke Company; the pressure being that of the ordinary supply in this district—namely, from 3 to 3¼ inches of water. The consumption was measured by a precision-meter of Messrs. Sugg, reading to thousandths of a cubic foot. As the photometric standard, a Harcourt 10-candle pentane lamp was employed; and the comparator was a Lummer-Brodhun photometer. The lamp was set up in my laboratory at a height of 8 feet above the floor; and the photometer, in this series of experiments, was about 26 feet from the lamp. Readings taken continuously in succession over half-an-hour gave a mean rate of consumption of 17·2 cubic feet of gas per hour; and the light, being slightly below the horizontal at about 6°, was 526-candle power with the lantern open. (The readings are in terms of the British candle standard, not the German or Hefner candle.) This is equivalent to 30·56 candles per cubic foot per hour with the lantern open, or 29·5 candles per cubic foot per hour with the lantern closed. The figures varied but little during the series of tests, due to slight changes of pressure in the supply and conditions of the atmosphere of the laboratory; the highest and lowest values observed being 31·5 and 29·65 candles per cubic foot per hour with the lantern open, or 30·4 and 28·6 candles per cubic foot with the lantern closed.

These results demonstrate that, from the point of view of performance, the application of high-pressure air to a low-pressure gas-lamp is quite as advantageous in illumination as the use of high-pressure gas, with great advantage from the point of view of safety, since nowhere in this lamp is gas raised to a high pressure.

The lamp is well adapted for street lighting, and can be fitted on any ordinary street standard. The mechanism is strong, durable, extremely simple, not liable to chance derangement, and the parts are capable of ready replacement whenever they need renewal. It can be used with gas from any ordinary supply at the ordinary pressures—each lamp being in all other respects self-contained and self-actuating. By reason of its simplicity of construction, it will not be expensive either in manufacture or in maintenance.

**Wales and Monmouthshire District Institution of Gas Engineers and Managers.**—The autumn meeting of the Institution will take place to-morrow (Wednesday), at Llanelly, the home of the incoming President, Mr. Thomas Acland, who will deliver his Inaugural Address. There will also be a paper by Mr. J. Mogford, of Briton Ferry. The members will be the guests of Mr. Acland at luncheon at the Stepney Arms Hotel; and subsequently brakes will convey them to the Old Castle tinplate works and to other places of interest in the neighbourhood. Members will also be welcome at the gas-works and the Company's show-rooms.

## RUBBER EXHIBITION AT OLYMPIA.

ANOTHER has been added to the already long list of trade shows held at Olympia—the Rubber Exhibition, which has been open during the past fortnight and closed on Saturday. There must be few industries into which rubber does not enter more or less; and, of course, of recent years its use has enormously increased, and is still growing. How important a business the cultivation of rubber trees has become will be judged when it is stated that in 1830 the imports of this article were represented by some 23 tons, while in 1907 no less than 33,364 tons came into the country. While, however, of general interest to nearly all traders, the exhibition did not contain much of particular application to the gas industry. In fact, there were but two stands—and these were not specially connected with rubber—to which reference need be made in the "JOURNAL." The first of these was that of Messrs. Tangyes Limited, of Birmingham, who showed a gas-engine run on suction gas supplied by a "B" size Tangye suction-gas producer. The capacity of the engine was stated to be 11 B.H.P. when run on suction gas, and 14 B.H.P. with the use of town gas. It was fitted with magneto-electric ignition gear and variable timing device, instead of tube ignition. There was also one of the firm's 9½ B.H.P. oil-engines, fitted with water injection arrangement and automatic igniter; a 6 inch by 8 inch vertical three-throw ram pump, suitable for working against heads up to 300 feet, and capable of delivering about 5760 gallons of water per hour; a No. 5 new pattern low-lift centrifugal pump, capable of delivering about 24,000 gallons of water per hour; and a 9-inch by 13-inch long-stroke vertical steam-engine. The machinery in motion was driven by "Teon" vulcanized textile belting. On the second stand was a Praed patent safety gas plant, in action. This is a petrol-air gas system; and the plant consists of a small hot-air motor, driven by a single burner using the gas which the machine makes. The motor drives a propeller which passes the air to the carburetting chamber; and at the same time it operates a small pump, which delivers a finely divided spray of petrol in the carburetting chamber—this having the effect of petrolizing the air passing through, and converting it to a gas, which is then ready for use. It is suitable for lighting, heating, and cooking; and the proportions of petrol and air are such that it does not come within the explosive limits.

## Dr. Beilby on Reform in Coal Consumption.

Dr. G. T. Beilby, the Chairman of the Governors of the Glasgow and West of Scotland Technical College, presided last Tuesday at the presentation of diplomas to the new associates. In addressing the gathering, he said it was in the belief that the College might be able to do something to dissipate the source of dulness in their city life that he proposed to speak to them of the relations of the College to reform in the methods of coal consumption. He was glad to tell them that they had already made a beginning in preparing for this reform, because theirs was the first institution in the United Kingdom to establish special laboratories for the teaching and study of everything connected with fuel and combustion. The most recent knowledge on these subjects told them that in the great majority of cases smoke and dust were quite unnecessary concomitants of industry. The inquiries of the recent Royal Commission on Coal Supplies had made it abundantly clear that the present inefficient consumption of coal in Great Britain not only led to the waste of from forty to sixty million tons per annum, but that the inefficiency was also responsible for the greater proportion of the smoke and dirt from which they suffered. It had been estimated that on the total British consumption 30 per cent. might be saved if the best-known means of consumption for each purpose were employed. He had made an approximate estimate of the coal position as it affected the industrial district in which they lived and worked, and he gave the value of the 16 million tons consumed as roughly £7,000,000. Taking a saving of 20 per cent. as attainable, they found that the saving would reach the very handsome figure of £1,400,000. He would like to indicate to them in what way the Technical College, in dealing with this subject, might advance the general welfare of the district, and at the same time open up new channels of useful employment for its students and associates. Special experts were needed if the reform was to be effected within a reasonable time; and their College had before it an important work in the education of experts of this description. It appeared that upon them must devolve the task of thinking out some simple plan of organization by which, on the one hand, the men they were training might have suitable opportunities to continue their education on the practical side, by taking a direct part in the conduct of combustion and heating operations on a practical scale, while, on the other hand, the prospect of permanent and remunerative employment might be opened up for these men after they had completed their practical education as experts. He sometimes pictured to himself an ideal state of things when the municipality should have seen its way to take the lead in this reform. When such a time came, the city would have its own central bureau for all that concerned fuel and combustion. The bureau would comprise a laboratory equipped with all the best apparatus for testing and recording, and would serve as a model for those manufacturers who desired to establish an independent organization in their own works.

# EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.

**Fortieth General Meeting, held at Leighton Buzzard.**

Leighton Buzzard again offered a welcome to the members of the Eastern Counties Gas Managers' Association last Thursday; on this occasion, the incoming President being Mr. C. F. Ruggles, the Engineer and Manager of the local Gas Company. The members began to assemble at the gas-works about noon; and were received by Mr. Ruggles, the Chairman (Mr. R. Richmond), and other members of the Board of Directors: Messrs. F. Pledger, F. Penton, G. Garside, and J. H. Green. Mr. Ruggles, jun., was also active in looking after the comfort and convenience of the visitors. Leighton Buzzard among gas managers has a popularity, which is shared in no small degree by the genial executive officer of the Gas Company; and therefore it was not surprising to find that during the day, including members of the Association and friends local and from a distance, the company engaging in the day's proceedings numbered about eighty. An inspection was made of the gas plant, about which there is nothing very extraordinary, but from which, in the hands of the capable Engineer, excellent results are obtained. On the works, with one of the gasholders as a background, the visitors were photographed in group; and thereafter they passed to the stores, the nests of which round the walls had been draped with flags, and floral decorations hung from the ceiling. Here luncheon was served; and the scene suggested that the union of business and pleasure need not, among commonsense men, be subjected to the sharp, concrete division that some people sternly impose. At the head of the table was seated Mr. Richmond; and he was supported by his directorial colleagues, the Chairman of the Urban District Council (Mr. G. Payne), and the Vice-Chairman (Mr. Platten). The retiring President of the Association (Mr. Joseph Davis, of Gravesend), was also present, as well as the Vice-President in succession to Mr. Ruggles (Mr. John Young). The luncheon was worthy the traditions of the town for hospitality.

Before the visitors left the table, the Chairman extended to them in words what they had already received in more material form—a hearty welcome to the town. He remarked that many of them had been to Leighton Buzzard before; but he hoped that upon those who had not, the present visit would have the same effect as it had upon those who were there a few years since—that was, that they would want to come again. He was very pleased to see so many present, and would be very glad if they would come again. As a Gas Company, they would always be pleased to see the Association. The indulgence of the members was then claimed by the President (Mr. Davis), while he expressed the gratitude of the visitors to Mr. Richmond and his co Directors for the cordial way in which they had welcomed the members, and the hospitable manner in which they had treated them. When they were in Leighton Buzzard four years ago, the Chairman had told them he would always be pleased to see the Association at any time. Probably he did not then think he would be seeing them again so soon (laughter); but nevertheless the Chairman and his fellow-Directors had, if anything, excelled the former cordiality of their welcome. It was, indeed, a great pleasure to the members to come to Leighton Buzzard, to be received by such genial hosts. The whole of the visitors most heartily thanked them.

These remarks were cordially endorsed by the members; and in his acknowledgment, the Chairman observed that he said four years ago they would be pleased to again see the members of the Association, and they would be equally pleased to see them again in four years' time. There was one other toast he should like to propose, and that was the health of the Chairman and Vice-Chairman of the District Council, who were present to assist in welcoming the members to Leighton. Though the Company were the hosts of the Association, he should like the visitors to feel that as townsmen they were also pleased to see them. Thereupon, Mr. Payne said that it gave himself and Mr. Platten the greatest possible pleasure to meet the visitors on this occasion. He warmly endorsed the Chairman's welcome, and hoped that those who had not been to Leighton before would be pleased by their little town and neighbourhood.

### Visit to "Ascott."

The members were impressed with the town and its surroundings; and, directly after lunch, they enjoyed a drive through the town to the charming and stately seat—"Ascott"—of Leopold de Rothschild, Esq. This is not the first time Mr. Rothschild has given the members special privileges, and extended to them hospitality for which they are deeply grateful. They drove into the famed, beautiful grounds—in themselves extensive and lovely, and situated in the midst of one of Nature's most charming scenes—and there wandered unhindered at their will. Mr. Jennings, in whom reposes the responsibility for the gardens and grounds, put himself at the command of the visitors in exploring favourite spots of special interest. The time passed all too quickly.

### The Business Meeting.

This was held in the Pavilion in the extensive grounds. At the commencement of the proceedings, the retiring President (Mr. Joseph Davis, of Gravesend) occupied the chair.

### The President of the Institution.

The President said, before he began the business of the day, he should like, in the name of the Association, to give a very hearty welcome to the President of the Institution of Gas Engineers, whom they were delighted to see present that day, and the more so as he happened to be a member of their Association—a fact of which the members were justly proud. They sincerely hoped he would have health and strength to carry out his high duties during the year. That they would be conducted with distinction to the profession, it was unnecessary for him to say.

These remarks were endorsed with great cordiality.

Mr. Thomas Glover (Norwich), in acknowledgment, said he thanked the President very much for his gracious words. He personally also felt proud that one of the members of the Eastern Counties Association had been chosen President of the Institution for the first time; and he would do what he could to uphold the honour of the Institution and of the Association.

### Minutes of Last Meeting.

The Hon. Secretary (Mr. T. A. Guyatt) read the minutes of the meeting held at Felixstowe on May 1 last; and they were confirmed.

### New Member.

Moved by Mr. E. W. Smith (Chelmsford), and seconded by Mr. H. Wimhurst (Sleaford), Mr. W. B. Farquhar, of Ilford, was elected a member of the Association.

### District Representative on the Institution Council.

Proposed by the President, and seconded by Mr. John Young (Hull), the incoming President (Mr. Ruggles) was elected to represent the Association on the Council of the Institution.

### The President's Medal.

At the last meeting, it will be remembered, it was decided that the past, present, and future Presidents, should be presented with a medal. The resolution has been carrried out; and sufficient medals have been struck for presentation to the Past-Presidents.

The President, at this juncture, asked that those Past-Presidents who were at the meeting should rise. Of them there were nine. In the order of their year of office they were: Mr. John Barton, Mr. John Carter, Mr. J. T. Joiliffe, Mr. H. Wimhurst, Mr. E. W. Smith, Mr. J. H. Troughton, Mr. J. S. Dougall, Mr. R. G. Shadbolt, and Mr. E. J. Brockway. Addressing these gentlemen, the President said he had the honour, as well as great pleasure indeed, in presenting to them a small token of esteem and regard from the Association and its members generally for the service rendered during the time in which they had severally occupied the chair. He need not go into the history of this medal, which had been designated the "Past-President's Medal." That each of the Past-Presidents thoroughly deserved the honour went without saying. It was difficult for him to find words sufficient for the occasion; but he could assure them on behalf of the members that they did feel very grateful for the kind assistance rendered to the Association by the Presidents from its inception. [The President here handed to each of the gentlemen named above his medal; and incidentally it may be said that the medals for Past-Presidents who were not present will be forwarded to them.] Proceeding, the President said the names of the recipients would be found suitably engraved on the backs of their medals; and he sincerely trusted that while the Past-Presidents were wearing the medals, they would serve to remind of the pleasant time spent in the presidential chair, as they would also serve to remind the members of their gratitude to those who had rendered eminent service to the Association. He heartily congratulated all the recipients.

Mr. Barton, as the Senior Past-President, heartily thanked the President and members on behalf of himself and his fellow Past-Presidents. Personally, he felt that he did not deserve this honour, as he was afraid he had not been able to render sufficient service to the Association. He could say, however, that he had

taken a keen interest in the affairs and work of the Association, and had watched with great pleasure its progress. Indeed, after the twenty years' existence of the Association, the promoters were very proud of its position. The Association started with a very small number—Mr. Carter, Mr. Wimhurst, and himself; and they managed to get four or five more interested in the project. He believed there were now about eight original members living; and four or five of them were present that day.

### The Retiring and the New Presidents.

Mr. Davis said the time had now arrived when, in the usual course of events, he had to retire from the chair, which he had occupied during the past twelve months with a great deal of pleasure to himself. He trusted he had carried out the duties of the office to the satisfaction of the members. At any rate, he had the pleasure of introducing his successor—a gentleman who was most popular among them all, and who would, he felt sure, carry out the duties in an excellent manner. He had therefore much pleasure in asking Mr. Ruggles, who had been unanimously elected, to take the chair.

Mr. Ruggles was received with acclamation, which he fittingly acknowledged. Proceeding, he remarked that his first duty was to hand to Mr. Davis the Past-President's medal, and also to ask the members to tender to him a hearty vote of thanks for his services during the year. Those of the members who were privileged to attend the meeting at Gravesend and also the spring meeting at Felixstowe would, he was sure, appreciate the remark that Mr. Davis had been the right man in the right place. He had during the year carried out his duties thoroughly and successfully.

The proposition was endorsed with applause.

Mr. Davis thanked the members for the cordial way in which they had received the remarks made by the President. The duties of the year had not been onerous, and they had been exceedingly pleasant. He had endeavoured to carry them out in the best possible way; and if he had given satisfaction, he had done all that was required. He should wear the medal with which the members had presented him with a great deal of pleasure, as it would serve to remind him of the pleasant time he had spent as President.

The President then read the following

## INAUGURAL ADDRESS.

Gentlemen,—My first duty on taking the chair is to thank you for the honour you have conferred upon me in electing me as your President; and I trust that, with the kindly support of the Committee and the guidance of our worthy Secretary, I shall go through my year of office satisfactorily to you, and with credit to myself. Were I in possession of some special information relating to the conduct of our business, or had I discovered something new in the method of gas manufacture, I should feel more happy in occupying your time and attention. But at each meeting of the several Associations, the respective Presidents have in their addresses so ably dealt with all matters of interest, and, further, our Technical Press is so ready to give full publicity to any new departure, that it is a very difficult task to find subject-matter to lay before the members of an Association such as this. I have very great pleasure, through my Directors, in giving you a hearty welcome to Leighton Buzzard; and although we have not a works of any great size to show, still, perhaps we may lay claim to being one of the small Companies in the country who have made good progress, taking into consideration the fact that the population of the town has been more or less at a standstill for some years.

### History of the Leighton Buzzard Company.

This Company was formed in the year 1835, and the prospectus for the same was drawn up by Messrs. John Barlow and Co., of London. A verbatim copy of this old form of prospectus [see top of second column] I reproduce, as I think it is of some interest when its simplicity is compared with the elaborate forms of those which one sees almost daily in the Press, to entice the public to take up shares at fancy prices.

The progress of the Company has been somewhat remarkable, as, from the time of its formation, three new works have been built on different sites. Yet by careful management the Directors have succeeded in keeping the capital account at a low rate compared with the consumption of gas. In 1836, the price of gas was reduced from 15s. to 14s. per 1000 cubic feet. The first dividend of 2 per cent. was declared in 1837. Twenty years later, gas was charged at the rate of 6s. 8d. per 1000 feet, and was reduced again in 1859 to 5s. 10d. Public lighting was charged at £2 15s. per lamp; the lamps being lighted from sunset until eleven p.m. for nine months in the year. It was at that time thought advisable to build a new works; and the capital was increased to £8956. In 1865, a dividend of 8 per cent. was declared. In 1882, seven acres of land were purchased close to the London and North-Western Railway for £1200; and for a third time the Company built new works. When building operations were commenced, it was found that the land contained a bed of fine building sand. A large portion was sold, the value of which resulted in a very substantial set-off in the cost of the removal of the works from the old site.

In 1884, the output of gas was 18 million cubic feet; and from that date onwards there has been a steady increase, until now the output is 53 millions. The capital of the Company is £20,000, or £377 per million; and the population of the district is 9000. I think the success of the Company may be attributed to the liberal manner in which the consumers have been treated; the Directors having fully recognized that the prosperity of the Company was best assured by carefully watching the interests of the consumers and securing their good will. The prepayment system was introduced in 1896, when further facilities were offered for the use of gas, and resulted in the fixing of coin-meters in houses where gas had been discontinued for many years and oil substituted, and also in the fitting of many small houses the owners or tenants of which would not incur the outlay.

The expense incurred in fitting the houses was covered by a small addition of 4d. per 1000 cubic feet to the price which was being charged for gas by ordinary meters; and the system at once became popular. Some four or five years later, the meters were set to give a supply of 19 cubic feet for each penny, at which rate they have since been kept, although the price of gas has been reduced on several occasions. When a reduction has been made in the price of gas, a proportionate discount has been given to the prepayment consumers, instead of an alteration being made in the quantity of gas supplied for a penny; and each time a reduction has been made, this discount has been increased, until it now amounts to 6d. per 1000 cubic feet. This sum is returned to the slot consumers each quarter. We collect from the meters monthly, but only return the discount quarterly. We not only find this discount system an easy method, and cheaper than changing the mechanism of the meter so frequently, but the consumers also take more care of the meters, as they contain money a portion of which is their own property. They seldom remove from their houses without informing us of the fact by post-card—stating that they are leaving and require the collector to clear the meter and to return to them what is owing as discount.

### Cheap Collection.

The system of collection and keeping of the accounts of this Company is very simple, and is carried out at small cost, amounting to only 1 per cent. on the sum collected, although the meters are distributed over a very wide area, and are chiefly situated in small properties. The average annual consumption of gas per meter does not exceed 10,500 cubic feet. We have in use 1080 coin meters and 850 slot cookers. For the latter a rental is paid; but the simplicity of the system is such that one youth collects the whole of the meters and the stove-rents monthly, starting regularly on the first of the month. The work is invariably completed in 16 or 17 days; an average of 60 to 70 meters being cleared per day. We have the card system in use. The statements of the meters and the amounts of money contained therein are entered on the cards. The cash is brought to the office twice a day, and is totalled and balanced with the amounts of cash received as entered on the cards. At the end of the collection, the quantity of gas consumed, and the money taken from each meter, is entered in the slot-rental book, and the totals brought forward in the general rental each quarter. Some may raise the objection that the check placed upon the collector is very slight; but we have the advantage that the money is quickly and frequently collected and deposited in the bank as the property of the Company, instead of lying idle in the meters, with the consequent loss

### PROSPECTUS

For Forming

A Company to Light the Town of Leighton-Bussard with Gas, February, 1835.

The increasing demand for gas, as a material for light and heat, is a convincing proof of its superiority over every other mode hitherto adopted; and it may now be considered rather as a necessary than a luxury of life. This circumstance, and the handsome and certain return which nearly all the gas-works in the kingdom are now paying, where the works have been properly completed, with a due regard to economy and the introduction of all recent improvements, by which all the causes which formerly prevented its adoption in private houses have been removed, so that it may now be introduced into the drawing-room with the greatest security and satisfaction. The town has been surveyed by an engineer, who estimated that the Company should raise a capital of £2500 in 125 shares of £20 each, to be paid up by instalments of £2 per share, any number of shares to be subscribed for in the first instance, but the appropriation of the shares shall be confided to the Directors, who shall give preference in such appropriation to consumers of gas.

*Estimates of Returns and Expenditure.*

Expenditure.

| | £ | s. | d. |
|---|---|---|---|
| 100 tons of Birchwood coal, at 24s | 120 | 0 | 0 |
| 25 tons of common coal for fuel, at 20s. | 25 | 0 | 0 |
| Wages, 2 men at 15s. per week each | 78 | 0 | 0 |
| Salary to clerk and superintendent | 25 | 0 | 0 |
| Incidentals | 25 | 0 | 0 |
| Wear and tear of apparatus | 30 | 0 | 0 |
| | 303 | 0 | 0 |

Returns.

| | £ | s. | d. |
|---|---|---|---|
| 510,000 cubic feet of gas, at 15s. per 1000 | 382 | 10 | 0 |
| 500 quarters of coke, at 4s. 6d. per quarter | 112 | 10 | 0 |
| | 495 | 0 | 0 |
| Deduct cost | 303 | 0 | 0 |
| Profit, 7⅛ per cent. | 192 | 0 | 0 |

of interest and risk of robbery, which in many places has become so common, chiefly because the accumulation of money is a temptation.

SUGGESTIONS.

The prepayment system spread so rapidly when it had "caught on" in this country that each company framed its own regulations; and no better work could be performed by the Commercial Sections of the various Associations than a full consideration of this subject, and the drafting of a form of agreement between gas consumers and the companies, which, while offering inducements to the general public to become users of gas, and imposing no unnecessary restriction or liabilities upon consumers, should give legal protection to the gas company and cover the many weak points that have from time to time been disclosed.

The question of proprietary right to the money once it has been deposited in the meters is, I believe, still an unsettled point, and some clause should be devised that would make it compulsory for the tenant to give notice of removal. We endeavour to secure this by our discount system; but all are not so fortunate. I may further state that the discount system has for many years been connected with our system of collection for ordinary gas-rental, and that instead of reducing the initial price, the discount has been increased, so that at the present time we give a rebate of 20 per cent. to ordinary consumers who pay their accounts by the first of the month following quarter-day. The result is of considerable benefit all round, as the cost of collection is greatly reduced, and also the risk of making bad debts; and in this happy condition of things the consumers' interest is connected equally with that of the shareholders of the Company. Anything that may tend to decrease the working costs of the Company is bound to result in further reducing the price charged for gas.

DEVELOPMENT IN INDUSTRY AND PRACTICE.

At the June meeting of the Institution of Gas Engineers, the President alluded to the continuous growth and prosperity of the industry in which we are engaged; and every word he uttered on the subject is amply justified by general experience. For nearly the full round of a century, the gas industry has had a place in our business and home life, and its past record is one of which we have not the slightest reason to be ashamed. Its present position we may well regard with satisfaction. Never in its history was the production of gas per ton of coal so high, never were the costs of production so low (so far as those charges are under our own control), and never was the percentage of our consumers so high in relation to the population whom we supply, as is the case to-day. Satisfied, even proud, as we may be of the history and present position of the gas industry—and there is no circumstance existing at the present time to weaken our confidence in its future development—the improvements and economies effected in the manufacture of gas during recent years have been considerable. But the limit in this direction has not yet been reached, and the next few years may witness a revolution in gas-works practice equal to any that have been seen in the past. Some of our best men are engaged in the search after still more improved methods, tending to the further cheapening of the costs of production and a still greater capacity for public service.

Not only have alterations been made in the method of handling materials, in the design and arrangement of the carbonizing plant, and in the details of the working processes, all leading to improvements in the manufacture of gas, but the system of distribution has also undergone a marked change. The improvements in the production of steel, and its application to the manufacture of solid drawn tubes by the "Mannesmann" process, leads to an increasing use of this material in place of cast-iron for gas-mains. The production of steel tubes up to 30 or 40 feet in length, with the advantages of increased carrying capacity, fewer joints, and flexibility, combined with the unbreakable nature of the material, happily coincides with the need that has arisen to resist the strains put upon our pipes by the methods now adopted in the construction of road surfaces and the increased weight of the traffic upon them; and these factors have contributed to shake the monopoly so long held by cast-iron pipes for the conveyance of gas and water.

The use of steel pipes has also assisted in the delivery of gas under much higher pressures than formerly obtained—in some cases up to 60 inches of water pressure. The high pressures not only allow outlying districts with increasing consumption to be supplied through pipes of small diameter, laid at comparatively small cost, but will lead to further developments in the use of high-pressure gas, by obtaining higher illuminating value per cubic foot of gas consumed. Recent invention has produced a gas-lamp (to be seen in operation at the Franco-British Exhibition) which, when working under 60 inches pressure, will give an illuminating value of nearly 70 candles per cubic foot of gas consumed; and it is probable that such high pressures will be more generally employed for public lighting and the illumination of large open spaces.

One great drawback to the use of light steel pipes for the purpose of distributing gas has been the difficulty of making a sound connection between the service-pipe and the main; but improvements have recently been made which promise to remove this trouble. The British Mannesmann Company have introduced a method to accomplish this. By the insertion of strips of metal, they increase the gauge on two sides of the tube, resulting in a thickening of the material in the position usually selected for the insertion of the service-pipe, sufficient to provide thickness for the number of screw threads requisite to secure a sound joint. There is also the Woodall and Parkinson expansion nipple—a device for riveting the end of the service-pipe inside the main. This method should prove of general convenience, as it is easy of application to any part of the main pipe.

COMPETITION.

During the last few years, we have had to recognize a new competitor in the modern suction or pressure gas producer plants; and therefore as the price of the raw materials for gas manufacture has increased, and railway and other rates and charges have advanced so considerably, these extra expenses should be met by enhanced prices obtained for residuals rather than any increase being made in the price of gas, which would be injudicious in many districts in the face of the comparatively large number of producer plants now in use. Recently I had to look into the alleged benefits, or otherwise, to be derived by the use of these plants; and the conclusions arrived at were that they are not altogether the unmixed blessings we are led to believe, nor have they in many cases been able to supersede the town gas supply where they have been installed—the latter being used as a stand-by, to be turned on when the plant fails or requires cleaning or repairing. One of our largest consumers of gas for motive power contemplated putting down a suction-gas plant; and in order to dissuade him from doing so, we have reduced the price of gas for power purposes to 2s. 3d. per 1000 cubic feet.

There are few industries in Great Britain which have made more rapid progress than the manufacture of suction-gas producer plants. When it is remembered that ten years ago they had been very little heard of, and then only in the experimental stage, but that at the present time there are over twenty firms engaged in the business, and turning out between them more than 250 plants per annum, it will be understood what strong competition they offer to gas companies, and how great an impression has been made on the minds of engineers of large manufacturing businesses. One point in their favour is that gas-works coke can be used in them with satisfactory results as compared with anthracite coal; and as the price of this latter fuel is steadily rising, there seems no reason why coke should not be generally used. Some little trouble must be taken at the gas-works to break the coke to a suitable size (about 1 inch cubes) and to screen out the dust. The coke should also be free from tar, and contain as small a percentage of ash as possible, and the extra cost entailed in preparing the coke should be added to the charge for same. An entirely new field is thus opened for the disposal of this residual, which should certainly tend to raise prices, and be the means of obtaining some compensation for any reduced power-gas consumption.

COMBINED COAL PURCHASE.

Seeing that in this section alone there are thirty-six works who contract for over 512,000 tons of coal annually, I am of opinion that the Commercial Sections throughout the country might take up with real advantage the question of the purchase of our coal. Until recently the price of coal was regulated by the law of supply and demand, and influenced by the prevailing condition of industry. Each of us could at that time negotiate the purchase of our coal separately. But we have now a new order of things with which to deal. Gas-coal owners are organized, and the price of our raw material is fixed, not by the general condition of the trade of the country, but by a resolution of the Associated Colliery Proprietors. We have seen how this has been worked during the last few months. The prices asked have been extravagantly high, and but for the hasty acceptance of these quotations by one or two large consumers, easier terms would have been probable. My suggestion is that we should meet a combination against us with something of an organization of our own; and if the procedure of the past season were repeated by the colliery owners, it should be possible to get a conference of gas-coal buyers together and determine upon a common course of conduct in relation thereto. Isolated action would be fatal. In this particular, our Commercial Sections may be of great service. Coal represents 50 per cent., more or less, of our total manufacturing costs. Its price has the most direct effect upon the price of gas; and we cannot afford to treat this matter with indifference.

WORK FOR THE COMMERCIAL SECTIONS.

In speaking on the market values of the residuals, our Commercial Sections have done good service to the members with reference to the sale of coke; but would it be out of place to examine our method of working this new departure, and consider whether the members have really received the benefit that was anticipated? We receive regularly from our Secretary a weekly or fortnightly return of the quantity of coke in stock at the various works in the Section, together with the current contract and selling prices. If in these returns the contract prices of all residuals were published, they would be of much greater value, and assist the members in the advantageous disposal of the same. We frequently find coke is being sent into our own districts from works 40 or 50 miles distant, and the Railway Company and the merchant to whom it is sold get the benefit. Could not a better price be obtained if the manager of the works from where it was sent ascertained the local value of coke in the district he was supplying? I am aware that full reports such as I have mentioned would entail a large amount of work for the Secretaries; but the advantages gained would warrant a larger annual subscription to cover the expenses of a paid Secretary.

An Association like this ought surely to be of the greatest service, not only to the manager, but also to the company with whom he is connected, and should be fully recognized by his Board of Directors. I am surprised to find that the smaller works subscribing to the excellent Society are so few in number, considering the large amount of information to be received for so low a subscription.

With regard to tar. It would be satisfactory to know the contracts made for this residual, and the price charged per gallon to county or town councils in each district, especially now that so much of this bye-product is being used for road-making purposes. In our own district we have sold several thousand gallons at 2½d. for this purpose. It came under my notice a short time since that a small works had for some time been selling their tar to one contractor. The best price the Manager could obtain from him was 15s. per ton; but on selling to another firm, they are now making 20s. per ton. In our own case, we have plenty of yard space, and we make up large quantities of mixed ashes and tar ready for use on paths. For this, we charge 10s. per load. We also allow builders and contractors to send their own material (such as gravel, sand, and stone) to the works and mix it themselves, giving them the use of our tar-copper; and we supply them with tar at 3d. per gallon.

Those of us who come under the Alkali Works Regulation Act would appreciate the remarks made by the President of the Institution of Gas Engineers as to the kind assistance rendered by the Inspectors when paying their periodical visits to a gas-works for the purpose of inspecting the sulphate of ammonia and other plants. They are often willing to make suggestions as to working the plant to obtain the best results, or if at the time of their call one is in a difficulty, they are always ready and willing to suggest a remedy. If this kindly feeling were shown by some of the other Government officials with whom we come in contact, how much more pleasant would be their visits, and how much more ready we should be to carry out all their suggested alterations, although in some instances we may think them to be quite unnecessary.

### TAR FOR ROADS.

So much has been written and said during the last eighteen months on the use of tar in road construction and maintenance, and so many experiments have been made, all of which go to prove its value when properly applied, that the subject has become indeed one of considerable importance and interest; and I have collected the following facts and figures, fully believing that the information will be appreciated. There are three methods by which tar may be used in road work: (1) Tar macadam; (2), tar grouting; and (3), tar painting or spraying. I now purpose briefly to describe and discuss these methods.

(1) *Tar Macadam.*—In this method, tar is mixed with either stone or slag in the proportion of about 12 gallons of tar to each ton of stone or slag. The latter should be heated till thoroughly dry and warm, and the tar should be just below the boiling point. Some difference of opinion exists as to the choice of the aggregate—that is, stone or slag; but, personally, I consider slag to be the better material, and for the following reasons: Slag is more absorbent than stone, and provided both are properly heated when mixed, the tar will almost entirely penetrate into the slag—thus rendering each individual piece waterproof. Slag, too, is cheaper; and although it has not the strength of granite, I consider it possesses the more desirable property—namely, that it absorbs the maximum amount of tar. The approximate cost of preparing and laying a ton of slag is as follows:—

| | s. | d. |
|---|---|---|
| Tar (12 gallons) | 2 | 3 |
| Slag (1 ton) | 5 | 6 |
| Haulage (to and from work) | 1 | 6 |
| Rolling | 3 | 0 |
| Labour | 2 | 6 |
| Spreading | 0 | 8 |
| Fuel | 0 | 2 |
| Total | 15 | 7 |

As 1 ton will cover 9 superficial yards, the cost per yard laid complete is something under 2s. It is generally acknowledged that a surface coating of tar should be given annually to tar macadam roads.

(2) *Tar Grouting.*—Under this heading, tar is used in some form in place of the usual grouting in with gravel, sand, or mud and water. The most successful method of "grouting" is that known as the "Gladwell" system, in which a layer of special preparation of tar matrix, known as "Tarvia," is first spread upon the road, after which the road metal is spread on and rolled in; the matrix working up between the interstices of the stones, thus binding the whole mass. This method, when finished with a top dressing of "Tarvia," has given excellent results, and is distinctly economical from a scavenging point of view. A thoroughly dry road, and dry weather during progress of the work, is a secret of success in this method.

(3) *Tar Painting or Spraying.*—In this, as in the former method, a dry road and warm, dry weather are essential to the success of the work, which should also be carried out on a road having a good surface. There can be no doubt of the benefits derived from tar-treating roads. The life of the road is prolonged, dust and mud are greatly minimized, and the surface coating of tar renders traffic less noisy. The treatment should consist of two coats of tar, the second somewhat thinner than the first. The road must be swept perfectly clean, so that the tar may penetrate through the surface—indeed, it has been found that on a road so treated the tar has penetrated through several inches. There are two ways of tar-painting roads. First brushing in the tar, sprinkling immediately with sharp sand or slag dust, and immediately turning on the traffic. Secondly, brushing in the tar and allowing it to dry into the road before sprinkling it with sharp sand or slag dust, and keeping off all traffic till the work is complete. I consider the latter method to be the more satisfactory, and, in fact, the only one which will withstand frost and thaw and will not "pick up." In the former method, the tar is never allowed to soak into the road; being taken up by the sand and only worn down to a crust by the traffic. The cost of this by manual labour varies from 1½d. to 3d. per yard, and although the cost exceeds that of machine spraying, the result is more satisfactory. The cost for spraying by one of the several machines on the market varies from ¾d. to 1½d. per yard, according to the quantity of the work carried out. Results of trials are forthcoming from all parts, and in all cases the opinion is that tar painted or sprayed roads, if the work is properly carried out, give less mud, are dry almost directly after a shower, and have a longer life than those roads untreated.

### SUPERANNUATION FUND.

We have heard much of late of the profit-sharing system being carried out on several large works throughout the country, but little has been said on the subject of a superannuation fund, which comes within the range of the smaller works. Some eleven years ago we started a fund, founded on rules and information supplied me by our esteemed friend, Mr. Jolliffe, the Engineer of the Ipswich Gas Company. The sum now standing to the credit of the fund amounts to about £700. Each of the employees pays 3d. per week; and if a man on attaining the age of 60 years has subscribed to the fund for five years, he may claim a pension of 10s. per week from the fund. Also the Company may, when they consider it necessary, require a member to take his pension on attaining the age of 65 years. So that, when the Old Age Pension Scheme becomes law, he will be in receipt of 13s. weekly, which will assist him in ending his days in comfort, or at any rate will keep him from the workhouse.

### INSTITUTION BENEVOLENT FUND.

There is one other important matter I should like to lay before this meeting. I mean the Benevolent Fund of the Institution of Gas Engineers. Now that our Associations are affiliated with the one Institution, we should endeavour to bring this excellent fund on to a proper footing, in order to allow the Committee to deal with the necessitous cases which arise. The subscriptions of the past three years average only £100 per annum; while the amount distributed to widows and others averaged £213 per annum. Surely in a Society like ours the members ought to subscribe a sum sufficient to cover the annual distribution. I am fully aware that in this Association there are many of us who can not afford to give our guinea or guineas; but it is quite possible for some who do not subscribe at all to give a few shillings a year, and let it be sent up in one sum, and entered as a donation "From the Eastern Counties Gas Association." If each of the Associations would do this, it would considerably augment the general fund, and we should have the satisfaction of knowing that we had assisted as far as we could in helping the widows and orphans of our fellow-workers. I should like, during my year of office, to start a fund such as I have mentioned;* and if once started, I feel sure the members of the Association would be glad to continue it. It is a lamentable fact that the sums distributed by the Committee during the past three years exceeded the amount of the annual subscriptions by £338.

There are many subjects which come to one's mind when writing an address which could be touched upon, but I fear I have already outrun your patience. I therefore thank you for your kind attention, and trust that one or two points I have mentioned may be found worthy of your consideration.

At the close of the address,

Mr. YOUNG said it was with very great pleasure that he proposed a vote of thanks to the President for the able and instructive address to which the members had listened. The interesting history of the works under the President's control, and the many points on which he had touched, would make good reading for the members, and give them food for consideration, after they had lost the personal charm of their President's delivery. There was one passage in the address which gave the secret of success in the management of a gas business. Their President said he thought that the success of the Leighton Buzzard Gas Company could be attributed to the liberal manner in which the consumers had been treated. That was one lesson from the address. It also showed that Mr. Ruggles had followed the events in the gas industry very closely; and he had given a *résumé* of them that was most interesting and instructive.

Mr. J. W. AUCHTERLONIE (Cambridge) seconded the motion, which was unanimously carried.

The PRESIDENT thanked the members very heartily. The preparation of the address, he said, had been a great pleasure to him. As he remarked at the end of it, if there were any points

* The President informs us that, during the meeting, £9 was collected for the Benevolent Fund of the Institution. This is good; and it is to be hoped that some at any rate of the contributors to the £9 will henceforth figure as annual subscribers to the fund.—ED. J.G.L.

worth taking up or thinking about by the members he should be glad; and it would repay any trouble he had taken in the matter.

### Tar Distilling in Medium-Sized Gas-Works.

Mr. John Young (of Hull) then read a paper on the above subject. With a report of the discussion, it appears to-day.

At the conclusion of the discussion,

Mr. R. G. Shadbolt said it was with the greatest pleasure that he moved a vote of thanks to Mr. Young for the paper. The style of the paper and the description of the plant and methods of working would indeed be very useful to those who might be called upon to erect and superintend the working of such a plant. The lantern slides had brought home to their minds, better possibly than anything else could have done, the working conditions under which tar was distilled at Mr. Young's works. As to the slides the author had also shown them, illustrating the way in which he had converted the street lamps of Hull, and the success he had obtained as the illuminator of those streets, he (Mr. Shadbolt) thought the record was one of which Mr. Young might be proud.

Mr. E. W. Smith seconded the motion, which was cordially passed.

Mr. Young in three words acknowledged the vote—"Thank you, gentlemen."

### The Spring Meeting.

On the proposition of Mr. J. West (Stamford), seconded by Mr. F. Paternoster (Felixstowe), it was agreed that the next meeting should be held at Stamford.

### Thanks to Mr. Rothschild.

The President proposed a hearty vote of thanks to Mr. Rothschild for his kindness to the Association. Those of them who best knew Mr. Rothschild could very sincerely express their gratitude to him. They knew him so well in the neighbourhood that nearly all they asked he was willing to give—in fact, he gave more than they asked. Among the generous and thoughtful considerations for which the Association were his debtors that day, he had provided tea for the members in the adjoining room.

Mr. Carter, in seconding, said that every member would agree that this was another of those delicate and kindly recognitions of the Association for which the members were greatly indebted to the owner of this stately residence.

The proposition was most heartily carried.

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The members having had tea in a room adjoining the main part of the pavilion, they drove back to the town; but before doing so, some of them made a further tour of the grounds.

In the evening, the members dined together at the Swan Hotel—the President occupying the chair, being supported by the other officers of the Association. Among the guests were the Chairman and Directors of the Gas Company and other local gentlemen, including the Chairman of the District Council. There was a long toast list; and between the speeches some excellent songs were rendered by Miss Mabel Owen, Mr. E. B. Hennigan, Mr. W. H. Garside, and Mr. F. M. Ruggles, and cornet solos by Mr. J. Hardy. The pleasure passed all too quickly, but memory of it and of the day will long continue.

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### Visit to the Davis Gas-Stove Company's "Diamond" Foundry at Luton.

On Friday, a large number of the members journeyed to Luton, in response to the cordial invitation of the Davis Gas-Stove Company, Limited. Saloon carriages were attached to 12.20 train from Leighton; and, on arrival at Luton, the party was met by the heads and representatives of the firm, and driven to the "Red Lion" Hotel, where lunch was served. Afterwards, the visitors were conveyed to the new "Diamond" foundry; and a most interesting and instructive tour was made of this large and up-to-date works. Mr. Henry, and Messrs. Cyril and Harold Davis, with several representatives of the firm, conducted the members through the various shops, and explained the many different processes. The opportunity for making this inspection of the works (which, it will be remembered, have been described and illustrated in the "Journal" on previous occasions) was much appreciated; and the outing was altogether thoroughly enjoyed.

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The suitability of a gas and air mixture for supply to a gas-engine or a blast-furnace depends on its thermal value, pressure, temperature, and moisture. These quantities are continually varying, and a simple method of testing the quality of the mixture is desirable. Herr W. Heim points out that when the proportions of gas and air can be varied at will, it is only necessary to withdraw a small constant volume of the mixture and ignite it, and to determine by repeated experiment which proportions give the highest flame temperature, as the mixture with this proportion will be the most efficient. The temperature indication can be conveniently carried out by means of an electric pyrometer and galvanometer. By attaching such an apparatus to a small chamber in connection with the gas-engine cylinder, the adjustment of the proportions of gas and air to the best value can be readily made several times a day to meet the varying conditions.

## TAR DISTILLING IN MEDIUM-SIZED GAS-WORKS.

By John Young, of Hull.

**[A Paper read before the Eastern Counties Gas Managers' Association, Sept. 24.]**

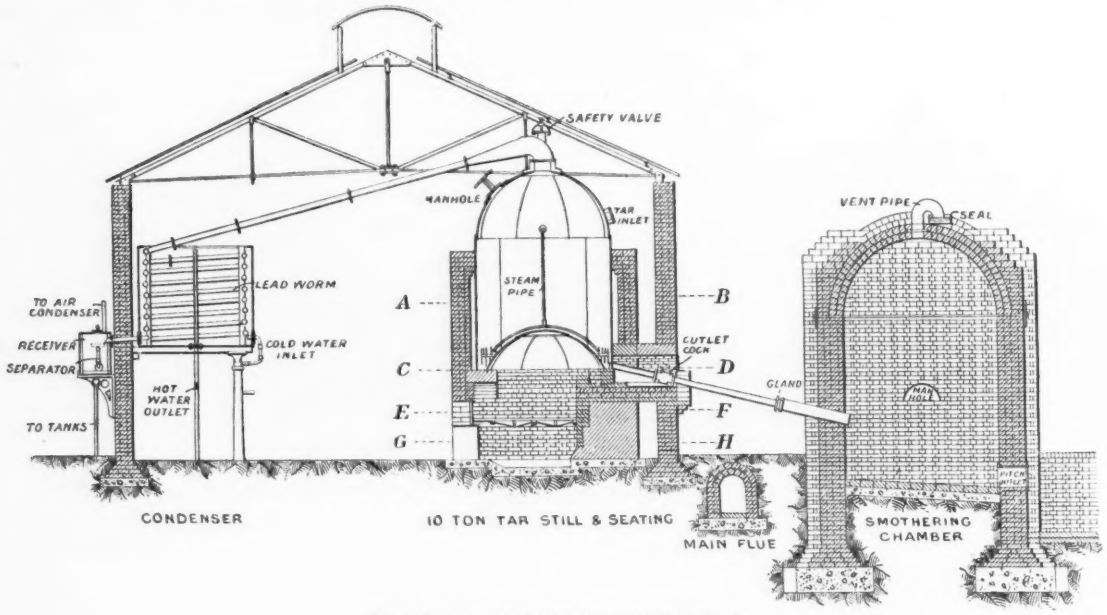
As long as prices for tar are good, the gas engineer is well content to "take the good the gods have sent" and think kindly thoughts of the tar distiller. When prices go down, down, down, as they have been doing for the last few years, the gas engineer is inclined to think, and sometimes to speak, disparagingly of the moral rectitude of the tar distiller. He also thinks in a gloomy kind of way about burning his tar for fuel or erecting plant to distil it. The mere fact, however, that prices of tar products are so exceedingly low is sufficient to deter him from this latter alternative. Yet, paradoxical as it may seem, that is the very time to consider whether it is better to pay carriage on the raw material or distil and endeavour to realize as fair prices as possible on the resultant products; for there is no doubt there are numerous cases where the cost of carriage from the gas-works to the tar distiller's works is sufficient to warrant the erection of small plant and the distillation of the tar on the site of its production.

It may therefore be interesting to give a short description of the tar-distilling works at the British Gaslight Company's Hull station. The stills, five in number, are 8 feet in diameter by 12 feet high. They are of the usual type, with crown bottom and dome top. It will be noticed that the dome top is higher than is usually adopted. We have found that increasing the height of the dome tends to better and easier working. The stills should be constructed of wrought iron. The tendency of to-day is to substitute mild steel for almost all positions in which wrought iron was at one time used; but I would warn anyone against this practice in cases where the material is liable to severe corrosion. Mild steel corrodes very much more rapidly than wrought iron. Even in steam-boilers I would strongly recommend a return to wrought iron. It will be noticed that the bottom of the still is made in accordance with the usual practice; but my next new stills will be differently constructed. The bottom of the side sheets will be turned inwards to form the gutter, and the bottom plates will be riveted on to this flange. This arrangement will not only give more room for expansion and contraction, but will also enable us to remove the whole of the bottom, when repairs are necessary, without interfering to any great extent with the brickwork.

The still is set with a slight tilt backwards, so that the lowest point of the bottom is the blow-off pipe. This ensures the whole of the contents being run out when the still is emptied. The method of setting the still is shown on the drawings (p. 858). The plan on the line GH shows the ash pit, on the line EF the arrangement of fire-bars, on the line CD the brickwork ready to receive the still, on the line AB the interior of the still with the steam umbrella fixed, and shows the heat-chamber surrounding the still. The remaining plan shows the top of the brickwork and dome of the still. The heat of the fire is kept well up into the crowned bottom of the still by a bridge of fire-brick. The hot gases pass over this bridge, circulate round the outside of the still, and eventually reach the main flue after having completely encircled the body of the still. A small opening in the fire-brick bridge directly under the blow-off pipe permits sufficient heat to permeate the sand with which the blow-off cock is surrounded to keep it always warm. The blow-off cock is built into a small chamber, which is filled with dry sand kept warm by the radiated heat of the fire, as before explained.

The interior of the still is fitted with a series of steam-jets arranged in a similar manner to the device patented by Messrs. Trewby and Fenner in 1879. The still is fitted with a safety valve of the dead-weight pattern; and it also has a manhole similar in design to the usual steam-boiler manhole. The still head-pipe is of cast iron, and is connected by wrought-iron tubing to the condenser, which consists of a lead worm immersed in water contained in a cast-iron cylinder. The wrought-iron tubing suffers considerably from corrosion, particularly at the joints. In making these joints, our practice is to use cast-iron flanges through which the wrought-iron tubes are screwed, and the whole is faced-up in a lathe. The joint thus made lasts considerably longer than any other we have tried, as there is no cavity where corrosive liquids can lodge. The blow-off cock is connected to the smothering chamber by flange and spigot pieces, the spigot end of which works in a stuffing-box and gland, as shown. This enables us to disconnect quite easily; and no still is ever opened until it has been disconnected from the smothering chamber. This is done, of course, to ensure the absolute safety of any workman who may enter the still when not in use. The best modern practice, however, is to have a combination of two stills—one slightly larger than the other; the larger one being placed at a higher level than the smaller. The large still is filled with cold tar, and contains a condensing worm. The distillate from the lower still is passed through this worm, thus making the larger still into a condenser, the contents of which are gradually heated until all the ammoniacal water and naphtha have been driven off. When the distillation in the lower still is completed and the pitch run off, the contents of the upper still are immediately run into the lower one. The upper still is refilled, and the operation repeated.

By this method a saving of fuel to the extent of from 30 to 40 per cent. is effected; and the life of the stills is considerably

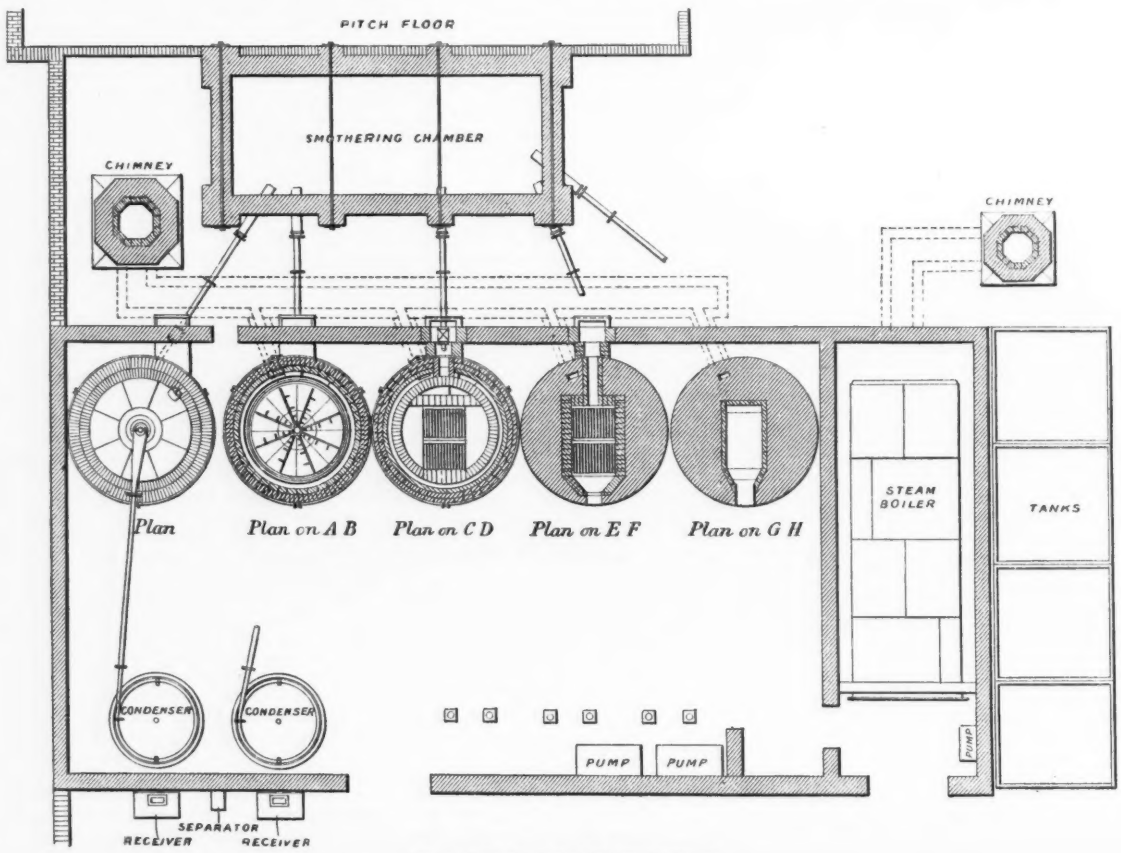



**Cross Section of the Hull Tar-Distilling Plant.**

prolonged. Expansion and contraction of both stills is not nearly so great as by the old method, and the lower still, exposed to greater heat, is preserved from the corrosive action of the ammonium compounds, as they have been expelled from the tar in the upper still. This process was invented by Ellison and Davis in 1886; and I am surprised it has not been generally adopted, especially in large tar-works. I am not prepared to say that it would pay to demolish our present plant for the sake of erecting this more modern one; but in erecting new works I should certainly adopt this principle.

Our method of procedure in tar distilling is as follows: The stills are filled with tar to within a few inches of the dome. In the case of the still shown, this represents 1975 gallons of tar. Heat is then very gently applied by means of a small coke-fire. The first distillate commences to come over at a temperature of 70° C. (taken by means of a thermometer inserted in the neck of the still), and consists of a mixture of naphtha and water. Throughout this fraction until a temperature of about 107° C. is reached, great care has to be taken, as the tar is apt to prime-over, or "lift" as it is called in tar distilling. To prevent accidents, a small ½-inch hole, called the vent, is placed in the manhole cover; and until the water is practically off, this is only loosely plugged, so that a little vapour can escape in a steady stream. This is carefully watched, and at the first appearance of tar at the opening the fire has to be partly quenched by means of a hose pipe. The distillate, consisting of naphtha and water, is run into a small separator, in which the water sinks and is run off to the liquor well. The naphtha comes over at the top, and is run off to the storage-tank.

As soon as the still settles down, the vent is plugged-up and the fire increased. Samples of the distillate are constantly taken, and the specific gravity tested. When approaching the change from naphtha to light oil, the distillate becomes greenish in colour and the water blood red. At a temperature of about 194° C., the specific gravity rises to about ·950; and at this point all water has practically disappeared, and the distillate passes direct to the




**Plan of the Hull Tar-Distilling Plant.**

light-oil tank. The density gradually increases until the specific gravity 1·00 is reached at a temperature of about 228° C. During the time naphtha is being collected, cold water is run into the condenser, the water outlet of which is kept at a temperature of 24° to 30° C. The quantity of cold water is gradually reduced as light oil is reached; the temperature of the water at the outlet of the condenser rising to about 64° C., when the change is made to creosote.

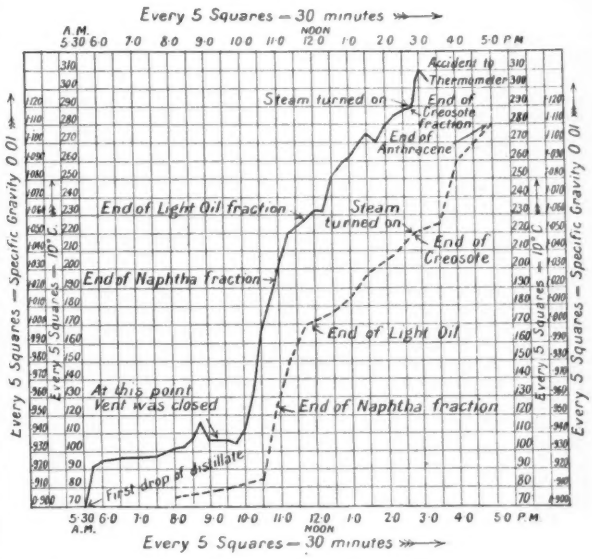
The portion of the distillate obtained between the specific gravity of 1·00 and 1·050 and temperatures of 228° C. and 289° C. is known as creosote. During the time the first portion of this fraction is coming off, the temperature of the condenser reaches its maximum; the outlet water being about 93°. This is to prevent the deposition of naphthalene crystals in the worm of the condenser. If allowed to cool, they would solidify and block-up the pipe and cause the safety-valve to blow, which, in addition to being unpleasant, is dangerous. When the creosote distillate reaches a specific gravity of 1·030, and the temperature of the still is about 270° C., the condenser water is gradually increased and the temperature of the outlet water lowered to about 60° C. at the end of the creosote fraction.

The last fraction collected is anthracene. This is reached when the distillate shows a specific gravity of 1·05 and the temperature of the still is about 289° C. At the time the change from creosote to anthracene takes place, steam has to be turned into the still. In doing this, great care is necessary to see that all condensed water is blown out of the pipes and only dry steam admitted. The anthracene fraction is driven off by means of steam, and is continued until a specific gravity of about 1·11 is reached; the quantity taken off depending upon whether a soft or a hard pitch is required. The demand at present being for medium soft pitch, our practice is to leave this portion of the anthracene oil in the pitch, as at present prices anthracene is no longer worth the cost of extraction. On the completion of the last fraction, the steam is shut off and the fire drawn; the pitch and still being allowed to cool for about twelve hours. The cock at the bottom of the still is then opened and the pitch is run into the smothering chamber; steam being at the same time forced into the still through the steam-pipes at a pressure of 60 lbs. per square inch. The pitch, after a further cooling of about four hours in the smothering chamber, is run off into the pitch field, where it solidifies in about twelve hours. Directly the pitch is run out of the still, a fresh charge of tar is run in ready for the next working.

I stated that the present low price of tar is apt to make the gas engineer think disparagingly of the moral rectitude of the tar distiller. The tar distiller, as I have found him, is a hard, keen business man, but absolutely straight. In some countries a great premium seems to be placed on what is called "smartness" in business. We in England have an uglier name for it; and I am proud to think we still regard straightness as the great essential business principle. The late Peter Simpson, of Rugby, revered and loved by all who knew him, nearly at the close of his long and successful life said to me: "The true secret of success and happiness in life was enunciated long, long ago, and is contained in the few words, 'Be unto others good and true, as you would have them be to you.'" I think, on the whole, most of us endeavour to conduct our business with this great principle underlying all we do; and we must give even the tar distiller credit for at least as much good as there is in ourselves. It is, however, difficult to realize this when we note the difference in the price of tar to-day and that obtaining (say) three or four years ago. It would not be profitable to go deeply into the various causes of these fallen prices. It is sufficient to know it is beyond the power of the gas profession to alter the present depression.

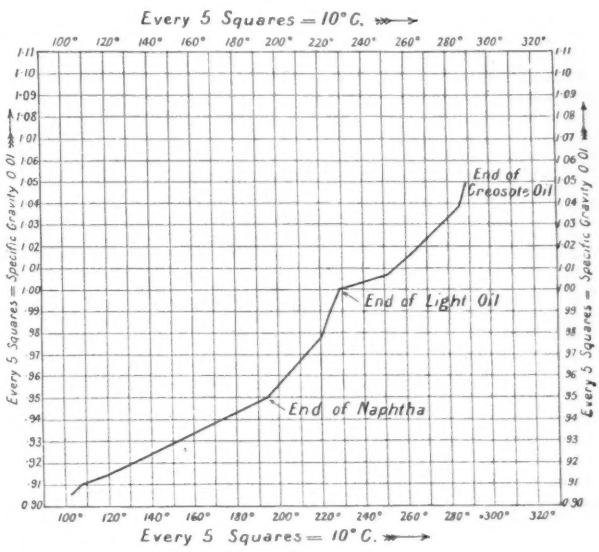
The erection of installations of coking plants with apparatus for the recovery of bye-products, such as the Simon-Carves, Semet-Solvay, Collin, Otto-Hilgenstock, Coppée, and others, has increased the output of tar products to an enormous extent. The demand in the meantime has failed to keep pace with the production. The recovery of bye-products from blast-furnaces where bituminous coals are used has also tended to lower the market. The pitch obtained from blast-furnaces is of inferior quality, and has to be sold at a lower price, which also tends to lower the general market. Even more important is the fact that the majority of the coke-ovens are carbonizing small coal upon the very collieries which a few years ago purchased pitch for making the small coal into briquettes. The result is that if 10,000 tons of small coal are carbonized, about 400 tons of tar are obtained capable of yielding 240 tons of pitch. To have manufactured the 10,000 tons of small coal into briquettes would have required 800 tons of pitch; so that by the erection of their coking-ovens they not only do not require 800 tons of pitch for every 10,000 tons of small coal carbonized, but they have also produced 240 tons of pitch for their own use. Thus each installation of coking-ovens, coking 10,000 tons of small coal per annum, has reduced the demand for pitch by 800 tons, and increased the supply by 240 tons per annum. These installations are being erected both on the Continent and in this country, and I believe that in some cases they are able to produce sufficient pitch for their own requirements in briquette making. The present outlook, therefore, for pitch is not very encouraging, although I believe that we have touched bottom and that we shall see in the coming year a rising tendency.

Tar, as we know, is an exceedingly complex mixture and varies in composition, not only because of the different grades of coal from which it is obtained, but also from the different conditions




**Curves Showing the Temperature and Specific Gravity Plotted against Time.**

The full line shows the Temperature; the dotted line the Specific Gravity.




**Curve Showing the Temperature Plotted against the Specific Gravity.**

under which it is produced. The temperature of the retort, the rapidity of carbonization, and the method of removing the gaseous products from the retorts have all an effect on the resultant tar. I give the average results of the distillation of 1000 gallons of tar obtained from Yorkshire coals: Naphtha, 35·56 gallons; light oil, 46·47 gallons; creosote, 309·02 gallons; pitch, 3 tons 11 cwt. 3 qrs. It will be noticed that the pitch is by far the most important item of distillation; and it will therefore be understood why the tar distiller has been compelled to reduce the price he offers for tar when it is remembered that four years ago pitch was selling at 55s. per ton, whereas to-day it is difficult to obtain more than 18s. a ton. It appears to me that a simple form of sliding-scale might very easily be adopted by all gas-works that do not distil their own tar. 1000 gallons of the average tar produced at any works could be submitted to an independent tar distiller, and from the results obtained a scale of prices could be arranged which would be satisfactory to both the gas engineer and the tar distiller.

Under existing conditions, the gas manager must sell his tar at least one year in advance; and there are probably heart-burnings if, during that period, prices of tar products should rise. On the other hand, the tar distiller must endeavour to protect himself from a fall in prices during the same period; and if a fair and equitable scale could be arranged, it appears to me it would be mutually beneficial. Taking the distillation results I have just given you, such a sliding-scale as I have suggested would work out as shown on the figures given next page. This represents the value of 1000 gallons of tar delivered into the tar distiller's works, and equals, as will be observed, 1·1d. per gallon. It would only remain therefore to deduct the cost of carriage from the gas-works to the tar distillery to arrive at the correct value of the tar at the gas-works.

| | £ | s. | d. |
|---|---|---|---|
| At present prices— | | | |
| 35·56 gallons of naphtha at 3¼d. per gallon . . | 0 | 10 | 4·46 |
| 46·47 ,, ,, light oil at 3d. ,, . . | 0 | 11 | 7·41 |
| 309·02 ,, ,, creosote at 2¼d. ,, . . | 3 | 4 | 4·53 |
| 3 tons 11 cwt. 3 qrs. of pitch at 18s. per ton . . | 3 | 4 | 6·90 |
| | 7 | 10 | 11·30 |
| Less 2½ per cent. . . . . | 0 | 3 | 9·30 |
| | 7 | 7 | 2·00 |
| Deduct 37½ per cent. for working expenses and profit . . . . . | 2 | 15 | 2·00 |
| | 4 | 12 | 0·00 |

On the table Mr. Young had a collection of samples of distillates from the plant; and to these he called attention. There was first a sample of the tar distilled (specific gravity 1·193), then of naphtha (specific gravity ·920), of water collected during the naphtha fraction, of water last running, of water with light oil floating on it, of light oil (specific gravity ·990), of creosote (specific gravity 1·007), of creosote taken just before changing to anthracene (specific gravity 1·050), of first runnings of anthracene (specific gravity 1·055), of anthracene with green oil separating out (specific gravity 1·090), of anthracene last runnings (specific gravity 1·110), and of pitch. The room was then darkened; and Mr. Young interested the members, by the aid of a lantern, with a series of photographic views of parts and details of the tar plant at Hull.

### Some Interposed Hints on Street Lighting.

Following this, complying with a request, be showed some slides illustrating the special work that had been done by his Company—the British Gaslight—in bringing the street lighting of Hull up to date. The modes of conversion of old lanterns, and the fittings necessary for the purpose, were thus pictorially explained. In converting street-lamps, it is evident Mr. Young believes in doing the thing well. He uses a new windproof top, and porcelain chimney and reflector, made specially for him by a pottery firm. He employs climbing lights for igniting the burners; and the lanterns according to size are equipped with from one to five burners. An important feature is, in successful lighting, the governing of the incandescent burners; and Mr. Young's faith is revealed when he says that he uses the Peebles diaphragm pressure governor. In his case, he does not allow a burner to be fitted until it is tested with this governor—that is to say, the governor and the burner are tested together; and in this way excellent success is realized. With regard to the use of india-rubber connections, formerly they were frequently found cracking from the outside, but the trouble has been cured by binding these rubber connections with india-rubber tape. The Company have not charged the Corporation anything for converting the street-lamps.

### Discussion on the Tar Distillation Paper.

The President (Mr. Ruggles) said they had had a most instructive paper from Mr. Young on the distillation of tar, and they had seen some excellent slides giving them much information on both the tar plant and street lighting. For these they all thanked Mr. Young.

Mr. T. Glover (Norwich), called upon by the President, said they had all enjoyed hearing Mr. Young read his very clear description of tar distilling as carried out on what he styled a moderate-sized gas-works. He thought some of the members would regard the well-known works at Hull as rather large works. Mr. Young, however, had not defined what was a moderate-sized gas-works. It was a relative term; and he had left the members in the dark as to what size works he would recommend should go in for tar distilling. He (Mr. Glover) gathered from the paper that the author did not strongly advocate that all present should adopt tar distilling; and it would be a misfortune if the impression were carried away that it would be profitable and advisable for all gas-works to become tar distillers. It would be an unfortunate thing if that were so, because of the difficulty there would be of selling the products advantageously if so many were dealing in them. Mr. Young's advice appeared to be that, if a tar distiller gave fair terms, and suggested a fair way of selling on a sliding-scale, they as gas managers should be content to deal with tar in the old way —that was, through the tar distiller; and if he (Mr. Glover) were asked for his advice, it would be much the same as this. But, as a matter of fact, there were situations and circumstances where it was advisable to go in for tar distilling, and, under certain circumstances, unfavourable to sell tar. Regarding other features of the paper, there were details as to the mode of distilling which they could discuss as tar distillers; but it was hardly worth while doing so that afternoon. The point of consideration for them was more to his mind a question of the general policy of distilling or selling on the sliding-scale. But he would point out that the tar distiller's difficulty in the early part of the distillation depended very much upon the quality of the tar. Mr. Young spoke about the precautions necessary to prevent the tar "lifting." This depended very much upon the water that was contained in the tar, and how closely associated with the tar it was. There were some tars which he believed it was absolutely impossible to distil alone. There was bad tar and good tar from the distiller's point of view, and some tar that needed to be mixed with tar from other works for distillation purposes. There was also the question about the anthracene fraction. His own practice differed from Mr. Young's in that respect. In his own case, they managed to make a medium soft pitch, and yet get a fair proportion of anthracene oil. They got the oil, and then strained the paste from it, and used the paste for softening the pitch. This enabled them to get an oil which was as valuable as creosote, and yet obtain a pitch of the right quality. They all liked the Golden Rule, and wished to conduct their business on the lines that they should do to others as they would be done by. He thought they all appreciated Mr. Young's kind disposition in the way he conducted his business; and they would try to follow his example. It occurred to him, from the figures the author had given them, that these products were from a good sample of tar, made from good coal, and were not spoilt in the process of distillation. It appeared that, including the carriage, the value of the tar at the tar-works was 18s. a ton, and over and above that the distiller got 37½ per cent. for working expenses and profit, which was about 11s. a ton. This seemed to be a very favourable position of things. All tars would not yield such favourable figures. If they allowed about 8s. for working expenses alone, there appeared to be about 3s. margin for interest on capital—otherwise called profit. He thought that most tar distillers would be very glad to work on some such lines. Tar distilling in connection with gas-works was just pure distilling; and in moderate-sized works, they did not make their distilleries into chemical works. They did not make cresylic acid, or carbolic acid, nor take it as far as making benzol. It did not pay to do this, except on a large scale. It did pay under some circumstances to distil tar; but it added more to the duties of the gas manager's life, and many were already pretty well worked, especially with the growing needs of their districts. Many might, all things considered, decide that it would be better to devote their energies to the development of the sales of gas rather than to undertake the distillation of tar.

Mr. J. H. Brown (Nottingham), also at the request of the President, contributed to the discussion. He said his sympathies were almost entirely with the tar distiller. He (Mr. Brown) might not have been born with a silver spoon in his mouth, but he was born with the taste of tar. Except for a period of perhaps five years he had been dependent upon the tar-distilling industry. He should therefore like to say at the outset how greatly he appreciated Mr. Young's paper, and the fair way in which he had dealt with the question. There were many points on which he should be disposed to join issue with Mr. Young, from what he had seen of the photographs and certain statements that had been made. But he did not think that such matters would be of particular interest to the members; there were so few of them who were actually engaged in this class of work. The chief point for their consideration was, as Mr. Glover had said, what were the terms they could obtain from the distiller for the sale of the tar. Generally speaking, in his opinion, it did not pay to distil unless they had something like 2 million gallons per annum with which to deal, or the works were at a port. Take, for example, a case like Lancaster, where they had an exceptionally successful tar-works. But there, again, they were in an ideal position for the shipment of products, and generally for dealing with the tar industry. There was one point he should like to mention regarding the details as to the construction of the stills. The author advocated wrought-iron stills; he (Mr. Brown) should go in for, and strongly recommend, cast-iron tops to the stills. A considerable saving was found by having cast-iron still tops, cast-iron worms, and a different outlet (or, as Mr. Young called it, "smothering") chamber, into which the pitch was run direct from the stills after distillation. He thought the whole of the smoke nuisance (shown in one of the photographs) could in this way be avoided. Indeed, there was no doubt at all that in some districts Mr. Young would find very considerable difficulty with the residents if he attempted to create such an intolerable nuisance. He noticed that Mr. Young suggested that steam at 60 lbs. pressure should be placed in the stills to force out the pitch into the cooling ventilator. This compelled him (Mr. Brown) to ask at what pressure would the safety-valve on the top of the still blow off. It would be dangerous to use such a high pressure of steam in a still of ordinary construction. It would not be possible with a cast-iron still, nor with the lead worm Mr. Young had mentioned in speaking of one of his lantern slides. With regard to the fall in the price of products, Mr. Young correctly stated that the tar distiller was not in any way responsible for the fall; and he (Mr. Brown) should like to suggest that the brokers—the people who dealt with the pitch, and took the products from the tar distillers—were largely responsible. He believed the rapid slump in pitch prices that took place eighteen months or so ago was largely due to the brokers selling forward at considerably lower prices than were at the time readily obtainable from all Continental buyers.

Mr. R. G. Shadbolt (Grantham) remarked that he was one of those who were interested in undertakings which could not even be termed moderate in size; and he wished to express his (should he say ?) disappointment to find there was no information in the paper which would enable him to judge whether, in the present state of the tar market, he would be justified in recommending his Directors to undertake tar distillation. That was the *crux* of the whole question—as to whether their respective undertakings were of sufficient size to enable them to advantageously distil their tar. The author put his argument in very much the same way as would be done if discussing the adoption of a sulphate plant, as to whether the saving in carriage on the ammoniacal liquor would not justify them in taking the course, "Prices being low,"

said Mr. Young, "this is the time to consider whether it is better to pay carriage on the raw material or distil, and endeavour to realize as fair prices as possible on the resultant products; for there is no doubt there are numerous cases where the cost of carriage from the gas-works to the tar distiller's works is sufficient to warrant the erection of a small plant, and the distillation of the tar on the site of its production." Of course consideration as to the saving on the carriage of the raw material by making sulphate of ammonia was an entirely different thing, because practically, by distilling a ton of tar, there was a ton of products left. There was not any such relationship between ammoniacal liquor and sulphate of ammonia. The question of carriage therefore did not, in his opinion, and speaking generally, seem to weigh in the matter at all. If Mr. Young, in his reply, could give some idea as to the smallest sized works, presenting average conditions, in which it would be profitable to go into the question of putting down plant for tar distilling, he would add much to the useful purposes that his contribution would serve.

Mr. YOUNG, in reply, thanked the members for having listened to his paper so patiently. It was exceedingly difficult to reply to one or two points that had been raised. Mr. Glover seemed to have grasped perfectly the idea of the paper, which was that, by giving the values of the products of certain tars, the members might, by obtaining the average production of their own tar, find out whether, in cases where the carriage was heavy on the raw material, it would pay to obtain the increased value of tar by distilling it themselves. Of course, they would then have to pay carriage on a ton of stuff just as they had on a ton of raw material; but it should be borne in mind that the carriage was on a ton of material of greatly increased value. To point this was one of the objects with which his description was written. Mr. Glover was quite with him in this particular. He was well aware that the average production of products was higher from good than bad tar. Most of the Yorkshire coals yielded excellent tar; and the difficulty his friends had in the east and the south in dealing with tars from north country coal particularly did not exist with Yorkshire coals—that was to say, the tar from the latter coal dissociated itself readily from the water. The amount of water contained in the tar from Yorkshire coal was small; while the thick viscid tar produced by north country coal seemed to act as a sponge. And the difficulty in tar distilling had to be overcome by the introduction of a centrifugal separator, or some other machine of the kind. Mr. Brown had spoken of cast-iron tops to the stills. So far as corrosion was concerned, he was perfectly right. But the expansion and contraction that would take place might prove dangerous to the life of the cast-iron top, and it would have to be much heavier to withstand the comparatively small pressure in the still.

Mr. BROWN: My own have been working eleven years.

Mr. YOUNG said experience was, of course, far preferable to any theoretical remarks of his own on this particular subject. On the point as to the pressure of steam, he mentioned in the paper that steam at 60 lbs. was put into the still just at the time of blowing off. This was merely for heating purposes; and the stills were kept so clean that they had never, in the whole of his experience, had to cut out anything from a still. When a still was opened after twelve months' working, every rivet-head was as clean as when it was put in. This was simply for the purpose of keeping at a proper heat the pitch as it flowed out at the bottom of the still. As to giving figures that would enable the members to judge the size of works in which it would pay to distil tar, it was very difficult; figures from one works being of very little use for the guidance of another works—that was to say, the figures of cost and the working conditions were so very different that it was almost impossible for them to serve as any reliable guide. The figures he had given in the paper, however, as to the value that certain products from 1000 gallons of tar would realize in the market at the present time, would enable the members to judge, by working backwards, how much they would get if they undertook the distillation of their tar, and put themselves in the position of the tar distillers. He thanked Mr. Glover, Mr. Brown, and Mr. Shadbolt for their remarks, and the members again for their patient hearing.

## GALICIAN PETROLEUM FOR GAS MAKING.

Herr Adam Teodorowicz, the Manager of the Lemberg Gas-Works, presented a paper at this year's annual general meeting of the Association of Gas and Water Engineers of Austria-Hungary, on the use of Galician petroleum oils for gas making. It has been published in the "Zeitschrift der Vereines der Gas- und Wasserfachmänner in Oesterreich-Ungarn" (formerly "Der Gastechniker"), from which source the following summary of its contents has been made.

After pointing out the large extent to which petroleum oils have been applied in America and England for the production of carburetted water gas, and their very limited application for the same purposes in Germany and Austria, the author proceeded to indicate the reasons for such a small use having hitherto been made of oil in Continental gas-works. The production of oil from the Thuringian brown coal is quite small, and apart from it Germany is dependent on imported oils, on which the carriage and duty are very heavy. The same conditions, however, do not prevail in Austria-Hungary, where the increasing production of Galician oil has driven American petroleum from the market. Indeed, in 1906 about 170,000 metric tons of Galician burning oil were exported. The reduction of the duty on oil imported into Germany for gas-making purposes to about 30s. a ton has led to Galician gas oil being imported into that country to the extent of 13,897 metric tons in 1907. Of late years also, plant for the manufacture of carburetted water gas has been introduced into the following towns in Austria-Hungary—viz., Vienna, Budapest, Triest, Lemberg, Cracow, Reichenberg, Innsbruck, and Agram. Few particulars have, however, been published as to the results of the use of Galician oils in these gas-works; and hence the author thinks an account of the result obtained at Lemberg may be of value.

The output of crude oil in Galicia amounted in 1907 to 1,117,597 metric tons, bringing Galicia up to the fourth place among the petroleum producing districts of the world. Of the Galician production, 86 per cent. comes from the Boryslaw and Tustanowice districts. The oil consists chiefly of saturated hydrocarbons of the paraffin series, and so resembles American petroleum. On distillation the Boryslaw oil affords 5 per cent. of gasoline, 50 per cent. of burning oil, 6 per cent. of paraffin, 10 per cent. of lubricating oil, 10 per cent. of gas oil, and 3 per cent. of coke—leaving 16 per cent. unaccounted for. Thus Galician crude oil should yield 10 per cent. of gas oil, or in the year 1907, 117,000 tons.

At present, the Austrian gas-works only consume about 7500 tons of gas oil in the manufacture of carburetted water gas, while rather more than as much again is otherwise used for gas making. There thus remains a large quantity of gas oil for exportation.

The Lemberg carburetted water-gas plant comprises two sets of apparatus according to Humphreys and Glasgow's system. Each set has a productive capacity of about 265,000 cubic feet per diem. The oil is stored in concrete tanks, from which it is pumped to the carburettors. Carburetted water gas mixes with the coal gas in the purifiers, which plan has the advantage of completely doing away with naphthalene deposits.

Investigations were made at Lemberg on the oils, first in the laboratory, and secondly in carefully supervised trials in the water-gas plant. The specific gravity of the oils used ranged from 0·878 to 0·885; the flashing point from 48° to 130° C.; and the calorific value from 10,473 to 10,685 calories per kilo. (18,851 to 19,233 B.Th.U. per lb.). The average composition of the oil was as follows: Carbon, 86·52 per cent.; hydrogen, 12·65 per cent.; oxygen, sulphur, and nitrogen, 0·83 per cent. Only a trace distilled below 150° C.; from 15 to 25 per cent. between 150° to 300° C.; 51 to 72 per cent. between 300° and 350° C.; and 4 to 10 per cent. between 350° to 360° C. The residue and loss accounted for the balance of 8 to 13 per cent. In the working trials of the plant, the coke used was weighed, and the breeze recovered was deducted therefrom. The clinker was disregarded. The oil consumed was measured by means of a reliable registering oil-meter.

The gas was analyzed and examined in the photometer and calorimeter daily. The temperature in the lower part of the carburettor was also taken frequently by means of a Le Chatelier pyrometer, and was kept at about 680° to 700° C. The coke used contained on the average about 81 per cent. of carbon, 2½ per cent. of moisture, and 14·4 per cent. of ash. The average results obtained during the months of March and April showed that 39·6 lbs. of coke and 26·45 lbs. of oil were consumed per 1000 cubic feet (corrected to 60° Fahr. and 30 inches) of gas made. The average net calorific power of the gas was 542 B.Th.U. per cubic foot at 60° Fahr. and 30 inches. The specific gravity of the gas was 0·64; and its average composition was as follows:—

| | |
|---|---|
| Carbonic acid | 4·47 |
| Heavy hydrocarbons | 9·53 |
| Oxygen | 0·34 |
| Carbonic oxide | 31·32 |
| Methane | 17·72 |
| Hydrogen | 32·30 |
| Nitrogen | 4·32 |
| | 100·00 |

The illuminating power of the gas when burnt at the rate of 5·3 cubic feet per hour in the Elster argand burner was 18·94 hefners (17·22 candles). The proportion of oil used was intended to give a gas of 5000 calories per cubic metre at 760 mm. and 0° C. net calorific value (532 B.Th.U. per cubic foot at 60° Fahr. and 30 inches). The crude carburetted water gas contained on the average 8½ grains of sulphur per 100 cubic feet, or less than well-purified coal gas.

The results obtained at Lemberg, when compared with those obtained by Dr. Leybold, of Hamburg, with American oil, and by Dr. Pfeiffer with Thuringian oil, indicate, in the author's opinion, that Galician gas oil must be regarded as a first-rate gas-making oil. In consequence of a rise in the cost of gas oil in the spring of 1907, consequent on the great demand in Germany, the author experimented with crude Boryslaw oil in carburetted water-gas plant. The crude oil had a specific gravity of 0·8599 and a calorific value of 19,040 B.Th.U. per pound. The oil consumed per 1000 cubic feet of gas made at 60° Fahr. and 30 inches was 27·7 lbs. The specific gravity of the gas was 0·69; the illuminating power in the Elster argand at 5·3 cubic feet per hour was 18·4 Hefners (16·67 candles); and the net calorific value was 546 B.Th.U. per cubic foot. The gas, however, contained 46½ grains of sulphur per 100 cubic feet prior to purification. Apart from this higher

content of sulphur, the crude oil gave practically as good results as the gas oil. As a result, it was decided to use a mixture of equal parts of crude oil and gas oil. When one of the carburetted water-gas plants was let-down for repairs, it was found that the upper layers of chequer work in the carburettor consisted only of *débris* of the fire-brick, while the lower layers were heavily coated with lamp-black. The lining of the carburettor was sound. The disintegration of the upper layers is no doubt due to the water contained in the crude oil. This water was probably introduced through the oil having been warmed by means of steam in the winter months, in order to render it sufficiently fluid for pumping. The deposit of lamp-black doubtless arises from the rapid conversion of the lighter fractions of the crude oil into gas, which is then exposed and partially decomposed in the carburettor before the remainder of the oil is gasified. Nevertheless, the consumption of crude oil in the winter months was not excessively large; and there appears no serious obstacle in the way of its general application for the manufacture of carburetted water gas.

# REGISTER OF PATENTS.

## Air and Gas Mixing Apparatus.

HALL, E. A., of Boston, Mass., U.S.A.

No. 17,329; July 29, 1907.

This invention relates chiefly to apparatus for mixing air and gas to produce a combustible mixture, adapted either for illuminating or for heating purposes; and it has for its object—first, to provide automatic apparatus for producing a current of air of regulated pressure, free from spasmodic variations or fluctuations which would be liable to affect the steadiness of a flame produced by a mixture of the air current with a suitable proportion of gas; and, secondly, to provide means enabling the pressure of the air current to regulate the pressure of the gas which is mixed with the air to form the combustible mixture.

Prior to this invention, the patentee remarks, the means proposed whereby the pressure of the air current will regulate the pressure of the gas has comprised a bell through which the current of air passes, and which, falling or rising according to variations in the pressure of the air within, closes or opens a cock in the gas-supply pipe. The gas and air pass into a mixing-chamber; and the extent of their inlet is controlled by a valve, the extent of obturation of which is dependent on the pressure of the mixture. In such a construction "there can be no nice adjustment of proportions to conform to variations in the quality of the gas and the character of the work to be performed, owing to the fact that the one valve serves to regulate the inlet both of the gas and air." Under the present invention, however, there are dependent regulating valves for the air and gas conduits, and means are provided to control the pressure in the air-conduit at a point between the mixing-chamber and the air regulating valve, so as to automatically control the positions of both valves, whereby the supply of air and gas is regulated. Such an arrangement, it is claimed, presents the advantage that any relative adjustment may be secured to conform to variations in the quality of the gas and the character of the work to be performed, whether it be heating, illuminating, or motive functions.

Again, constructionally the apparatus under this invention presents the further advantage that by employing independent air and gas valves —that is to say, valves arranged on separate spindles and in separate casings, and adapted to regulate the extent of aperture of the air and gas pipes respectively—they may be united to an air-bell forming part of the pressure regulating means by exterior connections, and thus are simple of access for repair and adjustment.

There are the usual pumps and pressure equalizer for the purpose of obtaining a power-actuated current of air to the apparatus; and, if desired, a valve, operated by the stoppage of the air-forcing apparatus, may be employed (in combination with the construction of apparatus referred to) for the purpose of cutting off the supply of gas should the air supply fail.

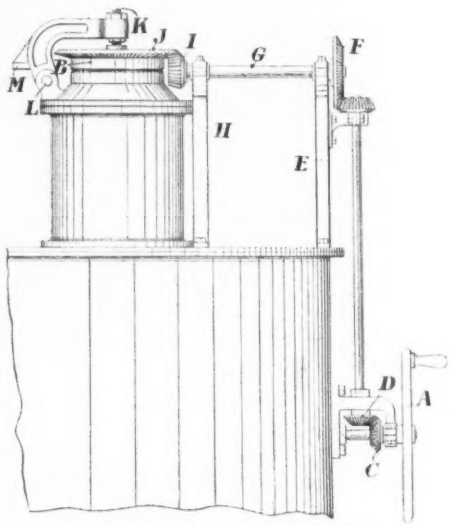
## Valves of Water-Gas Plant.

BAILEY, G. W., of Folkestone.

No. 20,208; Sept. 10, 1907.

This invention relates to the "stack" valves of water-gas plants so as to enable the valve and its seat to be relatively rotated from a convenient point without any liability of the attendant being incommoded by escaping gas—such as the operating floor—by means of a suitable system of gearing. One element of the gearing may be formed as part of, or attached to, the valve, so that the valve can be rotated on its seat by the gear, which can be varied to suit the requirements of different plants.*

According to the construction shown, movement is transmitted from the hand wheel A to the stack valve by means of bevel-gear; the valve B being arranged as usual in carburetted water-gas plant, above the superheater. The spindle of the hand wheel, which has keyed on it a bevel-wheel C, is journalled in a bracket secured to the side of the superheater. The bracket also provides a bearing for a vertical shaft carrying at its lower end a bevel-wheel D that gears with the bevel-wheel C. The upper end of the shaft is journalled in a bracket projecting from the standard E secured to the top of the superheater, and has keyed on it a bevel-wheel, which gears with another bevel-wheel F keyed on the outer end of a horizontal shaft G. This shaft is journalled in plummer blocks on the standards E H, and carries on its inner end a bevel-wheel I gearing with the bevel-wheel J attached to the valve B.




**Bailey's Stack-Valve for C.W.G. Plants.**

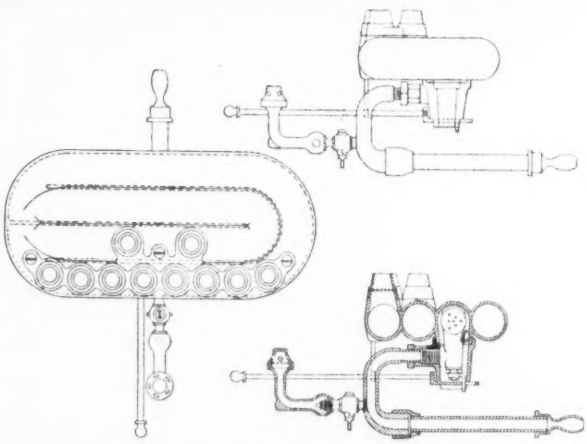
The valve-spindle K is carried by a curved arm keyed on a shaft L that can be rocked to lift the valve from its seat; and to facilitate the adjustment of the valve the upper portion of its spindle K is screwed and furnished with nuts, while upon the arm is provided a stop M to limit its movement and the lift of the stack-valve.

## Gas Heating and Cooking Burners.

SMITH, W. D., of Stratford, Essex.

No. 21,784; Oct. 2, 1907.

This invention relates to gas-burners for heating and cooking, such as were described in Patent No. 9407 of 1902—a burner consisting of two elliptical or oblong coils of pipe, the smaller of which is arranged inside the other but upon the same plane—the whole being formed of a single casting. At about the centre of the length of one of the parallel branches of the inner coil a longitudinal opening is made, from which a corresponding casing open below descends; external air entering at its lower end. In this casing is fixed a cock into which gas is admitted. The upper or wider end of the cock has two branches directed in opposite directions—directly in the centre of the tube, so that when the plug is opened gas is admitted, and is directed along the centre of the tube in both directions, taking with it a supply of air from the casing, and the air and gas becoming thoroughly mixed as they pass along the pipe. A central partition is arranged across the outer coil at one end; and the corresponding ends of the inner coil pass directly into the outer coil on each side of the partition, instead of forming a continuous bend



**Smith's Gas Heating and Cooking Stove Burner.**

as at the other end. The mixture of air and gas from one branch of the cock passes along the inner pipe directly into the outer coil, along one side of which it passes, then round the end, and back into the other parallel pipe of the outer coil. The mixture from the other branch of the cock passes along one side of the inner coil, round the end of the latter and back along its other side, and thence direct into the outer coil at the opposite side of the partition and round the end of the coil into the outer parallel pipe, into the other end of which the mixture from the other branch has been directed. Along the upper surface of the outer pipe into which the mixture has been directed a series of upright nozzles or nipples are made, through which the mixture of air and gas is discharged. A plate carrying a set of caps or nozzles is fitted over the upright nozzles and screwed to the top of the pipe; and discs of wire gauze are arranged between the upper end of the nipples and the lower end of the outer nozzles, through which the mixture passes and is ignited at the mouth of the nozzles.

* A brief illustrated description of the arrangement appeared in the "JOURNAL" for Dec. 31, 1907, p. 966.

According to the present invention, upon the inner pipe and adjoining the outer coil upon which the nozzles are fitted as described there are fitted additional nozzles similar in construction to those upon the outer coil, and the plate carrying the corresponding caps is formed with additional corresponding caps or nozzles, so that the plate can be fitted over the entire series of nozzles and screwed firmly down.

The additional nozzles are fitted with wire gauze, through which the mixture of air and gas passes and is ignited; and a greatly increased heat is said to be obtained—the air and gas being completely mixed before reaching the additional nozzles described.

Within the casing through which air is admitted as described an additional gas-supply pipe with cock is fitted, which, however, is not conducted to the interior of the coil, but is brought out at right angles from the side of the casing and again turned up vertically; its upper end being fitted with a nozzle and wire gauze (as in the case of the other nozzles), through which the mixture of air and gas is conducted to be ignited.

By suitably arranging the levers or handles for regulating the supply of gas and air, it is possible to shut off the supply to the coils and admit it to this additional burner alone, when, for instance, it is not required that great heat should be obtained, but only sufficient for (say) boiling water or the like, or, similarly, the single burner could be omitted, and the air and gas be admitted to the heating coil as described.

The accompanying illustration shows a burner of the general form outlined and adapted for use in ordinary fire places or grates—a plan of the burner, an end view looking to the left, and a transverse vertical section.

## Automatically Opening and Closing Valves.

AKTIEBOLAGET GASACCUMULATOR, of Stockholm, Sweden.

No. 27,024; Dec. 6, 1907. Date claimed under International Convention, Dec. 7, 1906.

This invention has for object to provide apparatus by means of which a gas-conduit can be opened or shut by the influence of light in such a manner that the conduit will be shut in broad daylight but opened in darkness. The invention is especially applicable for use in light-buoys, lighthouses, and similar signal apparatus, which heretofore have comprised lights burning day and night, but the lights of which, in fact, need only be burning when it is dark. The lights of such apparatus can be extinguished automatically at broad daylight, and be caused to burn when it is dark or in cloudy weather, and in this way a considerable saving of the gas necessary for the working of the apparatus is obtained while completely maintaining the security of the working of the apparatus; the arrangement being such that the signal apparatus light may accidentally continue to burn when it should possibly have been extinguished, but on the contrary cannot be extinguished when it should burn.

In the apparatus in question, a valve in the gas-conduit is automatically opened or closed by the arrangement of at least two bodies—solid, liquid, or gaseous—in such a manner that they are caused to assume unequal temperatures by the influence of light, and thereby to expand unequally and cause movement of the valve. For this purpose, if the two bodies are solid, one of them may be made light-reflecting and the other light-absorbing; and if the bodies are liquid or gaseous, they may be enclosed within separate vessels, one of which is light-reflecting and the other light-absorbing. Or one of the bodies may be exposed to the light rays and the other body be shielded from them by a screen or a covering. One of the bodies, or its vessel, or the two bodies or their vessels, may also be surrounded by coverings which are light-reflecting and light-absorbing respectively.

In any case it is essential that, by the influence of light, the bodies or their vessels receive and maintain unequal temperatures, whereby they also expand unequally. The bodies are, by mechanical or electric means, connected in such a manner with a valve inserted in the gas-conduit that it is kept closed owing to the unequal expansion, but is caused to open when the light disappears. Consequently, the difference of temperature and expansion of the bodies ceases to obtain. Apparatus embodying this invention can naturally be constructed in various ways.

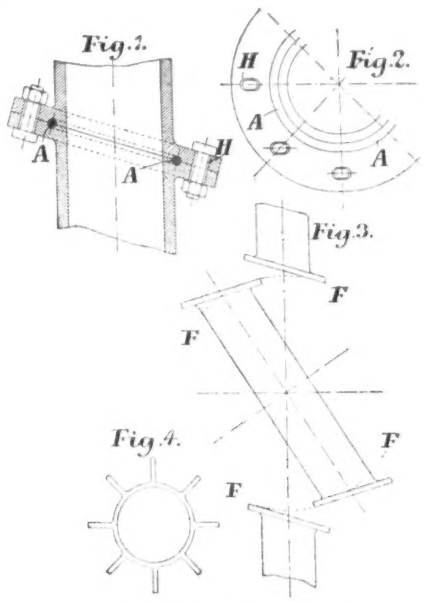
## Joints for Gas and Water Pipes.

GELLI, C., of Grosseto, Italy.

No. 28,708; Dec. 31, 1907. Date claimed under International Convention, Jan. 3, 1907.

The patentee points out that both spigot-and-socket pipes and flanged pipes connected by screw bolts passing through holes formed in the flange itself, as hitherto constructed, present the disadvantage that in the case of damage the piping must be disconnected up to one of the sleeves which have been provided in conduits at determined distances apart at considerable additional expense. In the case of flanged pipes, although the flanges may be planed (which entails considerable additional expense), yet a malleable gasket must be employed between them to ensure a tight joint, and which is spread out when the two pipes are united by tightening up the bolts connecting the flanges. Even if the gasket flattens only slightly, this will always be sufficient to prevent the replacing of the damaged pipe without opening up to a sleeve—the same as occurs in the case of the spigot-and-socket pipe. To this defect the disadvantage of the rigidity of the joint is also added.

He adds that a conduit of a length (for example) of 10 kilometres, made up of pipes of 1 metre diameter connected by flanges by means of screw bolts, and having sleeves at regular intervals, will be as rigid as if in a single length. Although there be a passage of fluid through the tubes, it will be sensible of variations in temperature to such an extent that, during the high temperatures of summer, there will be an expansion equal to 1 centimetre per kilometre, and, inversely, a contraction during cold temperatures of winter. Consequently, between the maximum heat and the minimum cold, the pipes will experience a displacement of 20 centimetres for each 10 kilometres—a displacement capable in a certain time of producing considerable damage in the pipe-line. With flanged pipes, the rigidity is such a grave inconvenience that it constitutes the weakest point in the installation of long conduits. The present invention has for its object to obviate such defects "by means of a simple and reliable system and with great economy."




**Gelli's Oblique Pipe-Joints.**

Fig. 1 is a section through the heads of two lengths of pipe; fig. 2 a partial front elevation of the face of one of the flanges; and fig. 3 a plan view showing the method of removing one of the lengths of pipe from a conduit.

A is a lead washer serving as a gasket, and which is to occupy the groove formed in the abutting surfaces of the flanges. It may be of circular form and situated one-half in one pipe and the other half in the other pipe. It is not essential that the groove be of circular section; it may have a section of any other convenient form. Pipes have already been constructed in this manner, but, according to the present invention, the plane of the heads—that is to say, the flanges—of the pipes are made oblique instead of vertical in relation to the axis of the pipes themselves, as indicated in figs. 1 and 3. The flanges are parallel to each other, so that a single pipe may be separated and removed and another substituted without submitting the rest of the conduit to the slightest shock or the least displacement. The sleeves may be abolished without having to disturb even a metre of the conduit, and need be employed only at points where the flow of the fluid is to be diverted.

Fig. 3 shows the manner of removing a pipe when the planes of the heads are oblique in relation to the axis of the conduit. When required to change a pipe forming part of the conduit, it is only necessary to loosen the bolts of the pipe to be replaced, then turn it in its length, in the direction of the arcs of circles F, and the p pe will be freed from the remainder of the line.

Beyond the advantage of being able to remove the pipe with facility, that of overcoming the rigidity of the entire conduit is attained; for besides making the heads of the pipes oblique, the holes H, for the bolts to connect same, are of oval or elongated form, whereby the pipe line is free to expand, contract, and support all vibration without injury. The direction in which the bolt holes are made oval should always be the same as that shown in fig. 2, with the object that in cases where the pipe-line has to shorten or lengthen itself the heads of two tubes which are in contact with each other may be capable of slipping one over the other for a length dependent on the extent of the oval of the holes. This system will permit of the use of pipes of a length of even 5 metres; thus effecting a great economy in the number of joints required in a stated length.

The oblique headed pipes can also be cast without difficulty, because instead of casting them vertically, the pattern may be placed obliquely, so that the oblique face of the head is situated horizontally.

The lead washer may be of any section suitable for the groove in the pipe heads, and may be in a single piece or in several parts. It may also be composed of unshaped pieces of lead, which by hammer blows may be rendered suitable for the introduction into the groove and to lodge therein. Such washer may also be formed with extensions or branches (as indicated in fig. 4) bent over the exterior of the flange, so as to permit of the centring of the washer at the moment of placing the pipe in position, and thus facilitating the laying operation.

## Controlling Gas-Lamps from a Distance.

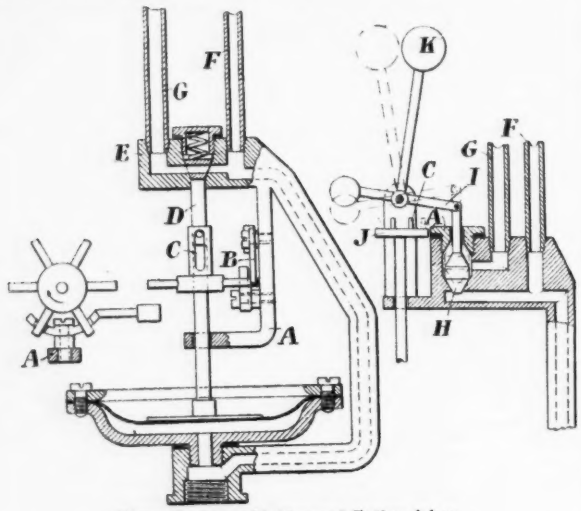
HIMMEL, G., of Tuebingen, Germany.

No. 7309; April 2, 1908. Date claimed under International Convention, July 23, 1907.

This invention relates to apparatus for controlling gas-lamps from a distance, whereby part or all of the flames may be lit and extinguished from any suitable central point in any desired series, and at any desired moment, by means of a pressure impulse in the gas-duct.

Fig. 1, p. 864, is an elevation (partly in vertical section) of the apparatus applied to a device for lighting at a distance, in which a cock is employed as the obturating member; and fig. 2 is the upper part of the device, with a plug valve as the obturating member.

The controlling mechanism opens or shuts off the gas to burners of ordinary construction, provided with permanent pilot flames or other igniting means. Attached to the lamp is a box containing a diaphragm (shown in its depressed position). Upon the diaphragm there rests a plate, on which a vertical rod is mounted so as to be capable of being easily rotated. This rod extends through a guide-part A, which also carries a rotating actuating device B. To the upper end of the rod is fixed a disc fitted with a number of radial arms, varying according to requirements. The disc has a sleeve formed with a longitudinal slot C, in which is a cross-pin fixed on the round spindle D. This spindle thus gears with the sleeve, and is fixed to the plug in the cock casing E. The plug is pressed by a spring on to its seat, and the spring and the plug are held together by a screw cap.




Himmel's Lamp Lighter and Extinguisher.

A head carried by the gas-pipe branches from the screw fitting that also carries the diaphragm box; and gas is thus admitted under the diaphragm, as well as to the cock. In front of the cock there is a pipe F, through which gas is supplied to the pilot flame; and behind it is a pipe G, which supplies gas to the main flame of the burner.

The present invention consists in producing rotation of the diaphragm rod simultaneously with its upward movement; and the spindle D with the cock will be rotated through exactly the same angle as the rod. That is to say, in the example shown, in six rotations, which constitute a complete revolution, the cock will have been opened three times and closed three times. Therefore if one hole less is employed, a lamp burning for half the night can also be operated according to adjustment. The rotation is effected by means of the operating device B on the support A.

Instead of a tap, a valve H (fig. 2) may be used, and rotary movement will be given it the same as described for the tap. In the lowered position, the valve closes the gas-supply pipe—that is, the burner-pipe G—whereas the gas has free access to the constant flame F. The double valve (constructed in known manner) is raised and lowered by a lever I turning on a pivot. A counterweight is so fitted to an arm of the lever that it always maintains the valve H pressed on to its upper or lower seat. To the upper end of the rod attached to the lower diaphragm is a horizontal disc J for reversing the lever, and on it three vertical pins are so fitted (concentrically and at equal distances from each other) that on each rotation of the rod a pin is situated first on the right and then on the left beneath the lever, and raises it, and, according to its position, turns it, by means of the counterweight K, to the right or left, and so opens or closes the valve H—that is to say, ignites or extinguishes. By corresponding variation of the pin, various series (day and night flames) are ignited, as with the tap. Between the gas supply pipe and pipes F G a horizontal tap may be arranged, with which, in the usual manner with constant flames, a single street may be lighted up without "pressure impulses"—on the occasion of a fire, for example.

## Firing Retort or Muffle Furnaces by Producer Gas.

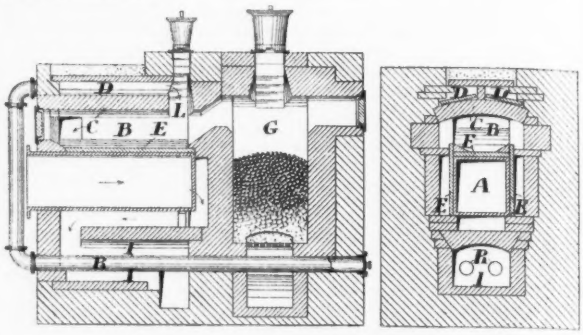
SCHMATOLLA, E., of Berlin.

No. 10,155; May 11, 1908. Date claimed under International Convention, Nov. 1, 1907.

In apparatus according to this invention, the producer is arranged in proximity to, and in direct communication with, a gas combustion chamber above the top of the retort or muffle, and the flames due to the combustion of the gas are guided along the sides and bottom of the retort, as shown in the accompanying illustration—a longitudinal and transverse section of a furnace fitted with a single retort.

The gas combustion chamber B is above the retort; while the heating gases escaping from the combustion chamber are guided first over the sides of the retort and then along its bottom. The heat radiated from the roof C is intercepted in air passages D, and again returned to the furnace by means of the air that supports the combustion of the gas. The retort is protected against the injurious action of the heat at the place where it is exposed to the greatest heat by means of a casing of plates E of fire-resisting material, which permit sufficient heat to pass, and at the same time reduce the temperature of the heating gases to such an extent that they can be passed over the retort without injuring it.

A comparatively short retort is employed, the sides being covered with fire-bricks, which can easily be exchanged while the furnace is in operation through a loosely bricked-up aperture provided for the purpose in the furnace front. In the case of a furnace with a longer retort, the casing on its sides may be dispensed with; but the horizontal floor of the retort is in any event left uncovered, and is directly acted upon by the producer gases, so that the heat can pass rapidly into the interior of the retort.




Schmatolla's Muffle-Furnace.

To enable the waste heat to be fully utilized, there is arranged, in addition to and beneath the retort-setting, a tubular recuperator I, comprising iron pipes R, through which air to support the gas combustion is conducted to the air-chambers D and to the combustion chamber B. These pipes are extended in the direction of the producer G or through the ash-pit to the outside, and thus further heated.

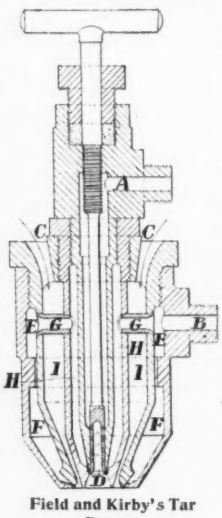
The upward prolongation of the air inlet L is constructed as a feed aperture, provided with a hopper for use in connection with the hearth B, and similar in construction to that of the producer G.

## Injectors or Atomizers for Crude Coal Tar.

FIELD, S. S., and KIRBY, A., of East Greenwich.

No. 12,859; June 16, 1908.

To overcome the difficulty experienced in using as fuel thick and viscous hydrocarbons like crude tar, the injector described in this patent is suggested as permitting the liquid to be injected "steadily and uniformly" into the flame of a furnace to be mixed with heated air so as to "promote perfect combustion."




Field and Kirby's Tar Burner.

A is the inlet for the tar; B, an inlet for steam; and C, the air inlet. The inlet A communicates with a central chamber in which moves a valve D. The head of the valve is hollow, and there are small holes in the wall of the hollow valve-head. By moving the valve in or out by means of the valve-rod one or more of the holes will be uncovered, and thereby the amount of tar emitted at the mouth of the injector can be regulated. Should the inmost of the holes become clogged, the others will still be available. If required, the valve-rod and valve may be entirely withdrawn and the valve cleaned; but this will very rarely become necessary.

The passages for the tar, steam, and air are thus arranged: The steam entering through B passes into the chamber E; a portion of it flowing into the head F of the injector, and ultimately issuing at the nozzle. Another part of the steam passes through channels G into a chamber H, immediately surrounding the central chamber containing the tar. From H the steam issues; and between the two steam-chambers H and F is an air-chamber I supplied from the inlet C. It will thus be seen that the tar flows through the central chamber surrounded by a steam-chamber H, which again is enclosed by the air-chamber I, which is in turn surrounded by a steam-chamber F.

The operation of the injector is as follows: Steam is admitted through B and fills the chambers E, F, and H, and on issuing induces a current of air in the chamber I. The usual injector action thus induced causes the tar in the central chamber to flow out through the holes and in the hollow chamber shown. The issuing streams meet and cross one another, and "cause the tar to be thoroughly atomized or to be divided into a shower of very fine spray."

**Wages of Leeds Gas Workers.**—The Leeds Gas Committee have again considered an application for an increase of 6d. per shift in the wages of all grades of men in the retort-houses. The matter was before the Committee some time ago, when the application was refused. It subsequently went before the Consultative Committee; but, at the request of the officials of the Gas Workers and General Labourers' Union, it was sent back to the Gas Committee to enable the officials to lay before the members further information in support of the application. The deputation, accompanied by Mr. J. E. Smith and Mr. Walt Wood, representing the Union, waited upon the Gas Committee last Tuesday, when it was found that the figures obtained by the gas workers' officials differed very materially from those furnished to the Committee by the managers of the various concerns. After some discussion, it was suggested that an equal number of the deputation and the Committee should together visit the works in question to obtain information concerning the rate of pay and the conditions of work. This suggestion was adopted; and the matter will be brought forward at a subsequent meeting of the Committee. The proposed increase, if granted, would entail an additional annual expenditure of £6000.

# LEGAL INTELLIGENCE.

## EDINBURGH AND LEITH GAS VALUATION.

### The Ground in which the Pipes are Laid.

On Wednesday last, the Town Council of Edinburgh—Lord Provost GIBSON presiding—sitting as a Valuation Court, heard an appeal by the Edinburgh and Leith Gas Commissioners against the valuation of £99,767 placed by the Burgh Assessor upon the portion of the undertaking within the city. In the view of the Commissioners, the entry should have been £87,745.

Mr. J. DUNCAN MILLAR, for the Commissioners, explained that they claimed that a proportion of the gross revenue should be deducted in respect of landlord's share of the expenses of management; and they objected to the capital sum fixed, on the ground that it did not include a sum representing the value of the land occupied by the pipes in the public streets. The undertaking was carried on in three different areas—the burghs of Edinburgh and Leith and the county of Midlothian. It had been the practice for the Assessors in the three areas to work on the same lines. They took the gross revenue for the year, less expenditure; and after some deductions they brought out a total sum, from which 5 per cent. was deducted, and the net valuation remained. Then this valuation was allocated as against the capital in each area, which was done according to the structural cost of the undertaking in each of the separate areas. This year the Assessors for Edinburgh and Midlothian had disallowed 4-10ths of the expenses of management. The appellants maintained the view which had been taken hitherto—that the whole of the expenses of management should be deducted. The other question was one of very great importance. It was, shortly, whether, in calculating the capital value of the undertaking for the purpose of allocation, the value of the ground in which the pipes were laid was to be added to the total capital value.

Mr. SPENS, for the Assessor, at this stage objected to the competency of the appeal, maintaining that the Court could not deal with the total value of the undertaking, but only with the value of the portion within the city of Edinburgh. The total valuation was arrived at under an arrangement which was begun in 1854, whereby the three assessors, by consent, fixed the total valuation and allocated it. Their valuation, of course, had no validity except in their own areas. What was being canvassed in the appeal was really something which the Court were not competent to entertain. They were asked to review the valuation of subjects which lay, not only within the city, but also in Leith and Midlothian.

The TOWN CLERK ruled that what the Court wanted to have before them was the amount which should go into the Edinburgh roll, and what the appellants said it should be. The figure applicable to the city of Edinburgh was £94,393.

Mr. MILLAR accepted this figure, but claimed the right to criticize the Assessor's method of arriving at it. He maintained that £94,393 had been arrived at by the erroneous method of disallowing 4-10ths of the expenses of management, and that the figure should be £87,745. It had been well fixed by judicial decisions that in an undertaking of this sort they were entitled to deduct the whole of the expenses of management. It was an undertaking in which, by Statute, they were prohibited from making any profit beyond meeting the expenses of working the undertaking. This very important distinction had been recognized in a number of cases. These Counsel quoted, and argued that the rule he contended for had been consistently followed for a long period. The Assessor for Edinburgh had admitted that this was a non-profit earning concern, for he did not allow any tenants' profits. The second question—whether they were to include in the valuation the value of the *solum* of the ground in which the pipes were laid—was rather a difficult matter. Beyond the pipes in the streets, they said, there were lands and heritages to be taken into account within the meaning of the Lands Valuation Acts; and that the Gas Commissioners were proprietors of the ground he referred to, in which their pipes were laid. Therefore the value of this ground should be added to the capital value of the whole undertaking for valuation purposes. The total capital figure they maintained should be increased to £1,427,696, of which the Edinburgh share represented £1,314,516. Against this, the figure which they contended should be entered in the valuation roll was £87,745, instead of £94,393. The gas undertaking was enjoying very important privileges under Statute in regard to the use which it had of the streets and roads. They were entitled to lay the pipes in the streets, and to take the exclusive use of the *solum*. The Corporation granted wayleave to the Telephone Company for a payment of £30 or £32 per mile. It would not be denied that this was an assessable subject. It might be said that the Gas Commissioners had a right under Statute which they paid nothing for; but if they considered the matter from the point of view of security, or from the point of view of the hypothetical tenant, the conclusion they must come to would be that the most important part of the whole of the Commissioners' undertaking was their right to occupy the ground in the streets. The very first question which would arise if a sale of the undertaking were to take place would be as to their right to lay pipes in the streets—the figure to be placed upon that right. Without this right the undertaking would come to an end. The question had been debated and decided in the Higher Courts. Upon the strength of these decisions, he argued that the *solum* of the ground within which the pipes were laid was heritage within the meaning of the Valuation Acts, and that the Assessor was bound to take into consideration the value of this heritage when valuing the undertaking. In a series of cases it had been decided that similar rights were assessable, such as in the cases of tramway lines, telephone plant, telegraph posts, railways, and water-pipes. In the leading case, in 1850, the House of Lords laid down emphatically that a company which had an exclusive right to lay pipes were owners of the land in which the pipes were laid. If the view of the Assessor were given effect to, it would follow that no value would attach to the most central part of the gas undertaking—that was to say, to the ground occupied by their pipes. The principle he contended for had been adopted in Leith; and if it were to be adopted by that Court, the method of valuation would then be uniform.

Mr. SPENS argued that the appellants ought to be content with the deduction of the tenant's share of the expenses, and were not entitled to deduction of the landlord's proportion. There were three sets of authorities upon the subject. The first was in the case of the Dundee Gas Commissioners in 1882, in which the Judges, while disallowing deduction for tenant's profits, nevertheless allowed some deduction for tenant's repairs. If the law had stopped there, there would have been no doubt that he was right and Mr. Millar wrong. The second class of cases occurred between 1882 and last year; and in them the opinions expressed were in favour of Mr. Millar. But last year, in the case of the Leith Docks Commissioners, the question raised was whether there was beneficial occupation. The decision of that case he claimed to be in his favour. The Leith Docks Commissioners were found to be not entitled to deduct landlord's expenses; and the occupation of the Leith Docks Commissioners was exactly the same kind of occupation as the Gas Commissioners had. As to the second point in the case, the appellants claimed ownership of the ground in which they had laid their pipes—it might be in the back greens attached to premises. This would not do. In order to give effect to this, the Court would require to adopt the principle that the Gas Commissioners were entitled to count such lands as part of their capital. The keynote of the case was cost. What the Court had to do was not to take into account what kind of property they were dealing with, but to consider the capital which was brought out in the books of the Commissioners—the property for which they had paid money. They ought not to take any account whatever of the fictitious view that the driving of a pipe through land made the Gas Commissioners owners of the land.

Mr. MILLAR, in reply, wished to make it clear that the revenue of the Gas Commissioners was not applied in the same way as the revenue of the Leith Docks Commissioners. The latter were entitled to raise revenue for the extension of their works, which the Gas Commissioners were not. The gas consumers would at once object to any such provision.

The Court retired to consider their decision; and on returning,

The TOWN CLERK intimated that they fixed the valuation for the city of Edinburgh at £94,393.

The appeal of the Gas Commissioners was accordingly dismissed.

Mr. MILLAR asked that a case for the Higher Court be stated, both on the principle and on the amount.

## Litigation as to a Gas-Mantle's Trade Mark.

At the Leeds Police Court last Thursday, before the Stipendiary Magistrate (Mr. C. M. Atkinson), a prosecution under the Merchandise Marks Act, which had previously been considered by his Worship, was concluded. The complainants were the Provincial Incandescent Fittings Company, Limited, of Manchester, and the defendants Messrs. F. W. Jeffery and Co., of Leeds. The complaint was that the defendants sold a gas-mantle under the name of "Jefco," and that this name so nearly resembled the complainants' registered trade mark "Jepco" as to be calculated to deceive. The defence was that in fixing upon a name the defendants had adopted the common practice of using a part of the firm's name. Mr. J. W. Jeffery, the Manager of the defendant Company, said he was not aware of the trade mark "Jepco" when he decided to use the word "Jefco." The Magistrate held that the name of the defendants' mantle so nearly resembled the complainants' registered mark as to be calculated to deceive, and that there had been a breach of the Act. In view of the defendants' intimation that there was to be an appeal, he would put his judgment in writing, and would then determine the amount of the penalties.

## Charge of Altering Time-Sheets.

At the West London Police Court last Saturday, John Cullin, 23, a clerk, living at The Hyde, Hendon, was charged, on remand, before Mr. Lane, K.C., with falsifying the accounts of his employers, the Gaslight and Coke Company, and also with conspiring with Robert Charles Tyler, 25, and Augustine Edwin Beare, 26, gas-fitters, both in the service of the Company—to defraud them of two sums of money by false pretences. Mr. Robert Humphreys, the Solicitor to the Company, prosecuted; and Mr. Oswald Hanson (Messrs. Hanson and Smith) appeared for Cullin. Mr. Humphreys asked that a remand might be granted on evidence of arrest. He added that Cullin had made a statement involving a confession of his guilt and implicating the other defendants. Detective-sergeant Sudbury produced Cullin's statement, in which he said he wished to make a voluntary confession, "so that innocent men should not suffer." He mentioned the names of six men whom he had overpaid, and added that all of them returned the money to him afterwards, and he put some of it in his own pocket. He then went on to say: "How it came about was this. Tyler was late one hour, and I filled up his time-sheet showing full time, and on pay-day I told him what I had done, and he replied, 'Oh, thanks!' This was done on three or four other occasions, and we shared the money so obtained on these occasions. On one occasion I told Beare I had put too much on his sheet, and that I had altered the clock to make it agree, and I took the extra money from him and put it in my own pocket. This happened on two other occasions, and we divided the money on these occasions." Beare exclaimed that this was a lie. The Magistrate remanded the accused, accepting bail for their appearance.

**Reductions in Price.**—The Luton Gas Company have given notice to the public that after the next survey of meters (Michaelmas) the price of gas will be reduced to 2s. 1d. per 1000 cubic feet. The St. Ives, Cornwall, Town Council at their meeting last Tuesday, confirmed a recommendation of the Gas Committee that the price of gas for private lighting and for cooking, heating, and motive power should be reduced by 3d. per 1000 cubic feet.

# MISCELLANEOUS NEWS.

## THE AMSTERDAM MUNICIPAL GAS-WORKS.

### Report and Accounts for the Year 1907.

We have received a copy of the voluminous report issued by the Corporation of Amsterdam on the working of the municipal gas undertaking for the past year. There are two gas-works—viz., the east and the west. Both are now under the management of Heer J. van Rossum du Chattel. The report records the loss sustained by the undertaking through the death, on July 3, 1907, of Heer D. van der Horst, who had been Manager of the gas-works since April, 1898.

A few of the more important figures may be abstracted from the report. The amount of coal carbonized was 97,117 metric tons in the west works, and 99,374 metric tons in the east works, of which quantities about 36 per cent. was English coal and the rest Westphalian, with the exception of about 1000 tons of cannel. Then there were also used 1913 metric tons of benzol and petroleum spirit; and at the east works there were consumed some 3433 metric tons of Solar oil for the manufacture of carburetted water gas. The make of gas per ton of coal carbonized, including carburetting materials, amounted on the average to 10,661 cubic feet. The total quantity of gas made at the two works was 79,843,680 cubic metres (about 2,819,727,450 cubic feet), of which 26·86 per cent. was carburetted water gas. The make of gas represents an increase of 8·27 per cent. over the previous year. The coke consumed in heating the retort-settings amounted to 15·86 per cent. of the weight of coal carbonized; while the coke and breeze produced amounted to 71·3 per cent. of the coal consumed. The west works contains two retort-houses, each with forty settings of nine 20-foot retorts. The east works contain the same number of retorts.

The coal tar made amounted to 4·08 per cent. of the weight of coal carbonized. The tar is treated in centrifugal separators, which reduce the proportion of water in it to 2 per cent. on the average, and to 5 per cent. as a maximum. The liquor produced yielded ammonium sulphate equivalent to 0·7586 per cent. of the coal carbonized. There were also produced 59·467 metric tons of yellow prussiate of potash. The distributing system was increased in length by nearly 0·8 per cent. in the course of the year. The street-lamps in use numbered 9011, of which over 600 contained more than one burner. The number of prepayment meters in use on Dec. 31 last was 47,451, which is an increase of 8050 within the year. The number of ordinary meters in use was 44,163, which figure represents an increase of 1209 over 1906.

The average cost of coal delivered on the works was nearly 14s. 7d. per ton. The carbonizing wages paid amounted to 2s. 9½d. per ton of coal carbonized. Both these figures are slightly higher than the corresponding ones for the previous year. The result of the year's working is that a sum of 1,570,536 florins (about £140,878) has been contributed to the municipal chest. The report contains a large number of diagrams showing graphically the growth of gas consumption in Amsterdam over a series of years; the make, consumption, and quality of the gas for each month and week of the past year; and much other statistical information relating to the working of the undertaking.

## OWNERSHIP OF THE NORWICH GAS-WORKS.

### Council Discuss the Advisability of Purchase.

One of the members of the Norwich Town Council—Mr. Dunnett—being of opinion that they ought to see if they could not, by acquiring the gas undertaking, supply gas to the citizens at a cheaper rate than is now being charged by the Company, moved at the last meeting the following resolution: "That this Council, in view of the present high prices being charged to the citizens of Norwich for gas, believe it would be to their advantage to acquire from the Company now trading as the British Gaslight Company, the plant, mains, pipes, meters, and other fittings used by them for the production and distribution of gas within the district known as their Norwich Station, and do at once appoint a Committee to prepare and lay details before a future meeting of the Council."

The proposal was regarded favourably by Mr. Cadman, who seconded the motion, on the ground that the taking over of the gas-works by the Corporation would enable a cheaper service to be provided and permit of the employment of more labour—and this under better conditions. They all knew that companies did not run their concerns for the benefit of the citizens, but for profits for themselves. He was not finding fault with them because they wished to make profits; but he wanted to see the profits transferred from the pockets of dividend-hunters into the pockets of the citizens.

Mr. Louis Tillett said he thought they would all agree that the prices charged by the Gas Company, and possibly by other companies, were not quite what they should be; but he would like to call the attention of the Council to the magnitude of the question raised by the resolution. It seemed to him that if this motion was passed as it stood, it would practically pledge the Council to purchase the undertaking at the present time; and after they had put their neck into the noose, there would be no possibility of withdrawing. It was apparently after having done this that they were to get certain details from a certain Committee. He was not quite convinced that this was the best way of transacting the business of the citizens. He should rather regard it in the nature of putting the cart before the horse. It seemed to him that they would be met with initial difficulties in connection with the taking over of the concern. The first difficulty, when the matter came to be viewed from a commercial standpoint, was whether or not the Corporation had the power, or could get the power, to take over the undertaking. He believed that in the past it was necessary to establish some kind of a grievance against a company. He was not going to discuss whether they now had a grievance of a reasonable nature. He felt that one was compelled, in justice to the Gas Company, to admit that, whatever might be said of the management in the past, the undertaking had never been better managed than was the case at the present time. Assuming that the first point was given in favour of the Corporation, and they were enabled to acquire powers of purchase, a second point would arise as to whether the terms of purchase would be so onerous as to make the matter a bad bargain to the citizens. What would the amount of the purchase-money run the city into, and what would be the cost of raising it? Let him recall what took place in 1896. At that time the Gas Company had promoted a Bill in Parliament. What did the Corporation do? They opposed it in the House of Commons, and tried to get the Select Committee to give them powers at some future date to obtain the undertaking by compulsory purchase. The Corporation went to very great expense in the engaging of eminent Counsel and experts. What was the result? In the first place, they did not persuade the Select Committee to give them the powers they asked for; and, secondly, they got the candle power increased from 14 to 15, with a saving clause to the Company that no proceedings should be taken against them if it was not below 14½. And last, but not least, the Corporation had an enormous lawyers' bill to pay. It was well to bear the experience of 1896 in mind. He did not want in the least to pour cold water upon the proposed acquisition of the undertaking, if it were possible and expedient. He therefore moved, as an amendment, that the whole matter should be referred back to the Law and Parliamentary Committee to consider and report; and he would suggest that the name of Mr. Dunnett be added to the Committee for the discussion of the matter.

After a few remarks by other members, the amendment was carried.

## TORQUAY GAS COMPANY.

### Issue of Further Capital.

In the absence through indisposition of both the Chairman and the Vice-Chairman (Mr. J. Kitson and Mr. W. B. Beynon), Mr. A. Iredale presided over the half-yearly meeting of the Torquay Gas Company, held last Wednesday. Mr. Beynon wrote that it was the first time for forty years that he had been absent from a meeting of shareholders. He congratulated them on the result of the half-year's working, and the healthy position of the Company, and said the employment of additional capital would make the works more up-to-date, and give greater facilities for manufacture.

The accounts for the six months ending the 30th of June showed that the revenue had been £19,351, compared with £17,090 in the corresponding half of last year; while the expenditure was £15,558, compared with £14,571. The profit balance amounted to £3792, against £2519; and after payment of the usual dividends, there was a sum of £432 to be carried forward.

The CHAIRMAN, in moving the adoption of the accounts and the payment of dividends at the rates of 10 and 7 per cent. per annum on the two classes of shares, said he thought the shareholders would concur in the opinion expressed in the letter. Coal had cost about £1650 more than during the corresponding period of last year (£8805 against £7257). This, however, was not all due to the higher price paid; a small portion of the additional cost arising from the extra quantity carbonized. Purification cost about £100 less (£255 compared with £359), which was due to the new system lately adopted; and as this had been in use for only about three months of the half year, the saving was gratifying. The cost of repairs and maintenance was about £500 less than in the first half of 1907; but this was a very fluctuating charge, depending largely upon the time of year in which the repairs were carried out. With regard to the receipts, sales of gas had realized nearly £1000 more—viz., £12,251 against £11,295. Of this increase, £678 was due to the higher price charged for gas and £278 to the additional quantity sold. The revenue from residuals showed a gratifying advance; coke yielded £4201 against £2748; breeze, £36 against £8; and tar, £389 against £333. From sulphate of ammonia, however, they realized only £621, compared with £775 in the corresponding half of last year.

The motion was carried.

The CHAIRMAN then proceeded to refer to the question of the capital of the Company, and moved that the Directors be authorized to issue 500 £10 shares, as provided by the Company's Act of 1894. He pointed out that the capital account was overdrawn to the extent of nearly £2000, and said the issue of new shares was required to pay off this amount and provide for the cost of new plant recently installed. The progress of the Company was shown by the fact that the make of gas increased from 110 million cubic feet in 1887 to 148 millions in 1897 and to 189½ millions in 1907. It was hoped that this year it would reach 195 millions. There had been a growth in twenty years of 80 million cubic feet; and the period of expansion had not yet come to an end. In 1897 the capital employed amounted to 14s. 2d. per 1000 cubic feet of gas made; whereas in 1907 it was only 11s. 10d. The capital expenditure was being husbanded in every possible way.

Mr. J. YOUNG, one of the Directors, in supporting the resolution, said their object was to make gas at as reasonable a price as possible, so as to compete with the electric light and other forms of illuminants. The principal part of the new capital would be devoted to improved methods of manufacture.

The resolution was adopted.

The CHAIRMAN moved, and Mr. C. N. LUXMOORE seconded, a vote of thanks to the officials; the latter remarking that it would give the shareholders pleasure if the employees could join them as shareholders.

The ENGINEER (Mr. Beynon) said that in many companies the workmen were given an interest in the undertaking; and he trusted the Directors of the Torquay Gas Company would have an opportunity of seeing what could be done in this respect.

The SECRETARY (Mr. R. P. Kitson) and the ACCOUNTANT (Mr. John Duckworth) also acknowledged the vote.

The proceedings then closed.

## THE REHOUSING QUESTION IN WANDSWORTH.

### Local Government Board Inquiry.

A few days ago, an inquiry was held in the Council House, Wandsworth, by Mr. F. H. TULLOCH, M.Inst.C.E., on behalf of the Local Government Board, on the question of the necessity for the Wandsworth and Putney Gas Company to build houses to accommodate persons who will be displaced by the proposed demolition of six cottages in Homewood Terrace. By a scheme arising out of the Company's Act of 1900, it is provided that the Company "shall not demolish any of the houses specified in the second schedule to the scheme, or displace any of the persons residing therein, until they have provided, on a site, and according to plans to be approved by the Local Government Board, such additional number of new dwellings as the Board may deem necessary, unless the Board should decide that a housing scheme in respect of such houses is not necessary." The Company represented to the Board that a housing scheme was not necessary; and the latter accordingly directed a public inquiry into the matter to be held. Among those attending it were the Company's Secretary (Mr. C. W. Braine), their Engineer (Mr. H. O. Carr), the Mayor of Wandsworth (Alderman J. W. Larden), the Town Clerk (Mr. H. G. Hills), and several councillors and officials.

Mr. BRAINE said the question to be decided arose out of a letter of the Directors of the Gas Company dated the 10th of July. In this they pointed out that the first schedule of the scheme had been carried out, and the persons displaced had been rehoused. They now desired to deal with the houses comprised in the second schedule. There were six of them, and four were occupied by 18 persons. In view of the number of houses in the immediate neighbourhood, many of which were unoccupied, the Company contended that it was quite unnecessary to build others to accommodate these few persons. Having briefly stated the Company's case, he proceeded to call evidence.

Mr. *A. W. Taylor*, an auctioneer and surveyor, stated that for the purpose of the inquiry he had visited the six houses proposed to be demolished. Two were in a dangerous state and shored up, and the other four were in a more or less dilapidated condition. After inspecting the property, he went into Warple Way and other adjacent streets, where he found various houses vacant, a list of which he handed in. In addition to these, there were a large number of empty houses. In the whole borough there were, he believed, quite 4000, and about 2000 in Battersea, while just on the other side of Wandsworth Bridge, in Fulham, there were a great many vacant houses. Consequently there would be no difficulty in the displaced persons finding accommodation.

In answer to the TOWN CLERK, witness said there were very few houses in the borough like those proposed to be pulled down. There were about 20 houses on the list he had handed in; the farthest one being less than a quarter-of-a-mile away. Within the area he had been over there must be some 250 houses, and 20 vacant ones constituted a large proportion.

Mr. *Moreton Riches*, a house agent, said there were about 153 empty small houses within a radius of a quarter-of-a-mile. In one road there were two houses which had not been let for twelve months. [Witness gave particulars as to a number of empty houses and the periods for which they had been vacant.]

Mr. *Arthur Wellings*, an auctioneer, also gave evidence with regard to the large number of empty properties in the district.

Mr. *P. Dodd* (the Borough Engineer) said the majority of the empty houses mentioned by Mr. Riches were beyond the quarter-mile radius; some being more than half-a-mile and others even a mile away.

In answer to Mr. BRAINE, Mr. *Riches* said there would be no difficulty in finding within the quarter-mile radius housing accommodation for the persons who would be displaced.

The INSPECTOR: *Primâ facie*, it seems that you could find houses for them three or four times over.

The TOWN CLERK stated that the Public Health Committee on the 10th inst. passed a resolution that, in their view, the housing scheme which the Company were required to carry out was still necessary.

Mr. *J. E. V. Taylor*, the representative of the Fairfield Ward on the Borough Council, said the property which was proposed to be removed ought to have been demolished some time ago. The neighbourhood had undergone great changes the last twelve or fifteen years; some 3000 people having left. The tramway facilities were very considerable, and were going to be increased; and this enabled the working man to live, as he desired to do, farther away from the gas-works. Considering the number of vacant houses in the immediate vicinity of the works, it would, in his opinion, be entirely unreasonable to require the Gas Company to carry out a rehousing scheme.

Mr. *Anderson*, on behalf of the Public Health Committee of the Council, said there was no question about the desirability for the demolition of the six houses in question. It would probably also be a good thing if a great number of other houses in the neighbourhood were demolished. But there was no doubt there was a considerable demand for houses there, by employees of the Gas Company, as well as those engaged at the Tramway Depôt and other works.

Dr. *P. Caldwell Smith*, the Medical Officer of Health, said that for the purpose of the inquiry he had made a house-to-house inspection in the immediate neighbourhood. The property in the district was inhabited solely by people of the working class; and the emptiness was nearly all caused by redecoration work.

The INSPECTOR: I have been round the district to-day, and made a list of vacant houses; and I must say I did not see any redecoration going on. [Mr. Tulloch read his list.]

*Witness* agreed that there were always likely to be vacant houses and flats in the streets mentioned, and in the neighbourhood of the gas-works; the reason being that the population was a shifting one. He was quite of opinion that there was always likely to be accommodation for twenty persons there.

In reply to the TOWN CLERK, witness said there were fewer houses and flats empty now within the quarter, half, and mile radius than there were in 1900, when the Gas Company's Act was passed.

Mr. *Dodd* gave evidence to the effect that since that date the Company had demolished 51 houses and displaced 277 persons, while they had provided accommodation for only 180.

Mr. BRAINE remarked that it seemed to him that the Borough Council liked the houses the Company had built, and wanted them to build more.

Mr. ANDERSON: Exactly; because the houses you erected are never empty.

Mr. BRAINE: No; because we have spent a good deal of money on them.

The INSPECTOR: I suppose I must not go back and tell my Board that it is the wish of the Council that the Gas Company should build houses because the Council like those that the Company have already built?

Mr. ANDERSON: The Company have a statutory duty to perform. We do not admit that they have provided accommodation for anything like the number of persons they have displaced.

Mr. *Shillington*, another representative of the Fairfield Ward on the Borough Council, and a member of the Public Health Committee, said he was present at the meeting of the Public Health Committee on the 10th inst., and, on the evidence then adduced, he was in agreement with the resolution passed. But after hearing the evidence which had been given, he had entirely altered his opinion. If the six houses had to be demolished, he did not think there was the slightest necessity for the Gas Company to build others in their place.

Mr. *Cresswell*, another member of the Council, said he had lived for some years in the Southfield Ward, nearer to the gas-works than Bodmin Street, where the Company had built houses to rehouse the persons displaced by them. He had never known so many empty houses as there were at the present time, and he saw no useful purpose to be served by building further in the neighbourhood.

The inquiry was then closed.

## THE WARRENPOINT COUNCIL AND THE GAS-WORKS.

### Proposed Purchase.

Last Tuesday, an inquiry was held at the Town Hall, Warrenpoint, by Mr. A. D. PRICE, M.Inst.C.E., on behalf of the Local Government Board for Ireland, into an application by the Urban District Council for a loan of £4000, to enable them to acquire the undertaking of the Warrenpoint Gas Company.

Mr. W. JOHNSTON represented the Council; Mr. R. A. MULLAN appeared for the Company; and Mr. P. J. DONNELLY attended to watch the proceedings for a number of ratepayers who object to the granting of the loan.

Mr. DONNELLY, in answer to the Inspector, said the first ground of objection was that there were other much more pressing matters that would require the attention of the Council than the purchase of the gas-works. The second, and the chief, ground of objection was that the price proposed was altogether out of proportion to the value of the works. As a matter of fact, as he was instructed, they were nothing but a mass of scrap iron.

The INSPECTOR: That is a very strong statement.

Mr. JOHNSTON said the matter of purchasing the gas-works came under the Council's notice by a letter which the Town Clerk received on the 17th of February last from Mr. Johnson, the Secretary of the Gas Company. The letter stated that at a meeting of the Directors held that day it was decided to recommend the shareholders to sell the gas undertaking to the Council at a price equivalent to £3 15s. per share. The capital of the Company consisted of 600 shares of £5 each, whereof £3 18s. had been paid up. The price mentioned was not to include the stock of coals and tar, or the movable fixtures and movable plant; but should the Council decide to purchase, the Directors would recommend them to have these at a valuation. It was pointed out that there was no necessity for the Company to sell, as inspection of their works and books would show that the concern was in a good position. Owing to the growth of the town since the works were first constructed, and the increased demand for gas, the Directors believed that the public lighting could be more efficiently maintained and extended, and greater facilities offered to supply the increased demand for gas, if the works were controlled by the Council. After receiving this letter, the Council decided to obtain the opinion of Messrs. Gillespie and Sons, of Glasgow. A member of the firm thoroughly inspected the works, examined the books of the Company, and advised the Council that £2250 was a fair price, and that they would be justified in purchasing the concern at this figure. Knowing the advantage to any town of possessing gas-works of its own, they took the matter up. Mr. Johnston then read correspondence which passed between the Council and the Company. At a meeting of the Directors on the 3rd of April, it was agreed that the purchase price should be reduced by £125, and that the amount to be paid for the undertaking, excluding the stock of coal and tar, should be £2125. Three months after the terms were agreed upon, the Company put in three new retorts at a cost of £70; and the Council would have to pay for these when taking over the works.

Mr. *B. M'Kernon*, the Clerk to the Council, stated that the valuation of the houses in Warrenpoint was £7594, of land £192 19s. 9d., and of tramways £60. The present rates of the town were 5s. 3d. in the pound. A penny in the pound would raise £33. If they obtained the present loan, it would increase the rates by 1s. in the pound.

Mr. *Thomas Smith* said he had examined the books of the Company, and had found the printed reports produced correct. The statements of account and the balance-sheets were prepared by him. The dividends paid by the Company from 1898 to 1907 were as follows: 1898, 6 per cent.; 1899, 5 per cent.; 1900-1, 4 per cent.; 1902, 5 per cent.; 1903-5, 6 per cent.; 1906, 5 per cent. In 1907 the Company did not pay any dividend, owing to the fact that they went to considerable expense in improving the works.

Mr. *John Gillespie*, consulting gas engineer, was examined with regard to the condition of the works, and said he was satisfied that they were worth £2250.

The proceedings then terminated.

## ELECTRICITY SUPPLY IN WEST HAM.

### Serious Allegations as to the Purchase of Lamps.

At the Meeting of the West Ham Town Council last Tuesday, Mr. Cohen raised a question in regard to the purchase of electric lamps. He asked whether it was a fact that the Electric Light Department sold lamps to a contractor, who afterwards resold the same lamps at a profit to another department of the Council. Alderman Littler replied that they sold things to a contractor; but whether he put them into the dustbin or turned them into commercial profit he did not know. This was regarded by Mr. Cohen as an evasion of his question, so he put it again. Was it a fact, he asked, that the lamps were sold to the contractor, and that he sold them again to another department of the Council. Alderman Littler replied that he had heard the report for the first time that night. Still Mr. Cohen was not satisfied; and when the report of the Highways Committee was presented he returned to the subject, and elicited from Mr. Wordley the statement that the Committee obtained lamps from the Electric Light Department, but that if they could buy Osram lamps cheaper from an outside party they did so. Mr. Cohen said the allegation had been made that the particular contractor bought lamps from the Electric Light Department and resold them to the Highways Department at a profit. Mr. Wordley said he thought he was right in stating that the Committee received them from a gentleman outside the district, who supplied them at a cheaper rate than their own department. Mr. Cohen said this was not an answer to his question, but went round it. Mr. Davis said that to him there was something serious about the affair. The Chairman of the Committee seemed to dodge the whole thing. First of all he did not appear to know, and then he said there was someone outside who had a large number of lamps, and sold them at a reduced price. Mr. Cohen asked the Chairman of the Committee if he would promise to investigate the matter, and bring up a report. At this point, a member who had tried to raise the question at an earlier stage of the proceedings rose to speak; but the Mayor (Mr. J. R. Moore-Smith) promptly applied the closure.

## PROGRESS OF GAS SUPPLY IN STIRLING.

### The Gas Company's Present Assured Position.

The "Stirling Observer" has lately contained a series of articles on the "Industries of Stirling and the District." In the issue for the 23rd inst., there was given an interesting sketch of the origin and progress of the Stirling Gas Company, accompanied by portraits of the Chairman (Mr. James Johnston) and the Engineer and Manager (Mr. J. D. Smith), and views of portions of the works and plant and the Company's show-room. The following is taken from the article.

Though coal gas was practically applied for lighting purposes in 1792 by William Murdoch, whose bust has a place in the Wallace Monument on the Abbey Craig, it was not till 34 years later that the new illuminant was introduced into Stirling. In June, 1825, a number of Stirling gentlemen, who had seen the new light in Glasgow, called a public meeting to consider as to the establishment of a Gas Company for the Royal Burgh. The gathering was attended by the leading business men of the town, and it was resolved to form a Company with a capital of £6000, in £10 shares; but it was also agreed that no one was to hold more than 20 shares "until after the townspeople had received the offer to subscribe." At the meeting, £200 was forthcoming; and very soon afterwards the whole of the shares were taken up. The Company having been duly formed, a site for the works was obtained (where they still stand), and the project was energetically pushed forward, with the result that on Nov. 27, 1826, the streets were lighted for the first time with gas. Naturally the occasion was the cause of much interest, not only in the burgh but outside of it; and the town was crowded with people to view the first lighting. The original area of the Company's supply was practically the same as it is now—Stirling, Bannockburn, Cambusbarron, and Causewayhead; but it was a long time before these villages took advantage of the new light. Even in Stirling people were slow to do so; but this can scarcely be wondered at when it is stated that the price was 15s. per 1000 feet, compared with 2s. 10d. now. Gradually, however, gas found its way into public favour; and by 1845 the price had been reduced to 6s. 8d. per 1000 feet.

The year named was a stirring period in the history of the Company. Dissatisfaction was shown with the price charged for gas and the profits earned; and the consequence was that the prospectus of a new venture—the Stirling and Suburban Gas Company—appeared in the "Stirling Observer" on the 27th of February. The capital was £7500, in 3750 shares of £2 each; the deposit being 2s. 6d. per share. The reasons for the promotion of the new Company, briefly indicated above, were fully set out. This attack upon them was not taken "lying down" by the old Company, who published a spirited reply a fortnight later, and promised a reduction in price to 8s. as from the previous Martinmas, and a further concession of 1s. at Whitsunday. This, however, did not stave off the threatened opposition. The new Company went on with the allotment of their shares, and announced that they had been over-applied for to the extent of £2000. It appears that an attempt was subsequently made by the Companies to come to an understanding; and it was eventually successful—an amalgamation being effected early in 1846. The share capital by this arrangement was increased to £12,400; and the enterprise proceeded smoothly for many years—the business gradually growing as the town and adjoining villages extended and increased in population.

There was some talk of the Corporation acquiring the gas-works in 1874; and they could have been purchased at that time for £25,000. But the authorities of the day considered the figure too high, and the project was dropped. In 1896, what appeared to be a more determined effort in the same direction took place. The public were again favourable to the acquisition of the undertaking, and affairs were so far amicably arranged that the Corporation and the Company each appointed an Arbitrator to value it. The Council's expert gave £62,000 as its worth, while the sum stated for the Company was £68,000. These figures amazed a large section of the public, and Sheriff Lees was appointed Referee to decide between the two amounts. He found that the value of the works was £65,000; and the Town Council then went to Parliament with a Bill to enable them to acquire the undertaking. This added fuel to the flames of opposition. A defence fund was founded and the measure opposed. The result was its defeat; and there was great rejoicing among the opponents. Subsequently the Company applied for statutory powers, and, in spite of strong opposition by the Corporation, obtained them.

A new epoch now opened in the history of the Company. Mr. Peter Watson, who had held the position of Manager for 35 years, retired, and was succeeded by Mr. J. D. Smith, under whose supervision the works have been practically rebuilt. All this has been done without costing the shareholders a penny, or curtailing the annual dividend; and now the possession of shares in the Company is not only the safest investment in the district, but is as good as can be found in Scotland. A few figures will easily demonstrate this. In 1825 (the year of the formation of the Company), the share capital was £6200, which is less than the profit earned last year. Now the capital is £82,000. In 1845, the annual make of gas was 4½ million cubic feet; last year it was 130 millions. In 1846, the annual profit was £461, with the price of gas at 6s. 8d. per 1000 cubic feet; last year the profits were £6500, while the price was 2s. 10d. When Mr. Smith went to Stirling, hand labour was the only kind employed at the gas-works. Now they are equipped with machinery of the most efficient modern type. Gas-cookers, gas-engines, penny-in-the-slot meters, incandescent burners, the manufacture of residual products—all these were non-existent when he took over the duties of Manager eleven years ago; whereas now they are the great profit-producing assets of the Company. Last year the gas consumers numbered 6476, and the large sum of £4272 was collected from 2316 prepayment meters. The number of cookers in use is 2700; and this is a branch of the business which, with gas-fires, heating apparatus, and gas-engines, is steadily increasing. The Company have a show-room in which all the latest and best cooking, heating, and lighting appliances are kept in stock and on view.

## PUBLIC LIGHTING OF BECKENHAM.

### Gas v. Electricity.

At the Offices of the Beckenham Urban District Council last Tuesday, an inquiry was held by Mr. H. E. Reed with respect to the Council's application for authority to borrow £1750 for the purpose of changing the street lighting from gas to electricity.

The Clerk (Mr. F. Stevens) said the Council asked that the period for which the loan was granted should be thirty years. With regard to the cost of converting the existing gas-lamps, for those upon the same side of the road as the cable it would amount to £2 per lamp; while for those on the opposite side the cost would be £3 11s. each. The present annual cost per lamp in the case of the Bromley Gas Company, who lighted the whole of Shortlands and part of the Langley Park wards, was £3 7s. 6d. per lamp; while in the case of the South Suburban Gas Company, who lighted the remainder of the district, the cost was £2 14s. per lamp. He explained that the difference in the cost was due to the difference in the commercial status of the two Companies. Owing to the large population of their district, the South Suburban Company were able to manufacture and supply gas cheaper than the Bromley Company.

Mr. *J. E. Tapper* (the Resident Electrical Engineer) said there were at present in the High Street, Beckenham, 17 arc lamps, each of 2000-candle power; and it was not proposed to alter them. With regard to the ordinary gas-lamps, these, with a vertical mantle, had a nominal candle power of 60, but the average was 37·8 candles. It was proposed to replace 596 gas-lamps with 572 electric lamps. There were upwards of 900 gas-lamps in the district; but the reason the Council did not propose to change them all was that the remainder were outside the limit of their existing cables. The station would be well able to take the additional load without any enlargement or additions. The new metallic filament lamps prevented the average increase in the supply of current which had previously taken place, as they used less. As the result of a series of tests, they found that the average life of a metallic lamp was 1602 hours, against the estimate of 1353 hours. They had previously no idea of what it worked out at, and estimated on three renewals per annum. A great many of them had run for 2070 hours and were still effective. He mentioned that the tests started on the 16th of June, and had been continued night and day till the 9th of September. The illuminating power was very well maintained; and the nominal 40 candles had worked out at an average of 36·5 candles. They started on an average of 41·9 candles. With regard to the cost, the Electricity Committee proposed to charge the Council for these lamps the same as they were paying the two Gas Companies. This would show a balance which would go to the profit of the undertaking.

Mr. *E. Manville* (the Council's Consulting Electrical Engineer) gave some particulars in regard to the tests. He stated that, starting on an illuminating power of 41·9 candles, after the first 300 hours it went up to 42·1 candles, and after 600 hours it rose a little more. After 900 hours it dropped slightly below the initial candle power. The general behaviour was remarkably even lighting. Witness pointed out that it might be assumed that the cost would be reduced, as many of the lamps used in the test were still burning. The average life per lamp was probably 1600 hours; and no doubt the price of the lamps would go down. The effect of the lighting was excellent; and, owing to the longer filament of the metallic lamps as distinct from the carbon lamps with the shorter filament, the light was as well distributed as gas. In reply to a question by the Inspector, witness expressed the opinion that, as regards the lighting of the district, they would get a better appearance from electricity than from gas.

The Inspector's report is awaited with interest.

## COAL CONSUMERS' LEAGUE AT NEWCASTLE.

### Mr. Balfour Browne, K.C., on the Mines Eight-Hours Bill.

Presiding, on Monday of last week, at a largely attended meeting under the auspices of the Coal Consumers' Defence League, at the Guildhall, Newcastle, which was held to protest against the Coal Mines (Eight-Hours) Bill, Sir W. H. Stephenson, the Chairman of the Newcastle and Gateshead Gas Company, remarked that the Bill was not taken up heartily by the miners of Northumberland, judging by the figures when the ballot was taken. The total number of voters on the register was 28,725; and of these 10,688 did not vote at all. Of those who did vote, 9251, or about 30 per cent. of the entire number, were in favour of the Bill, and 8786 were opposed to it. This justified the statement that the measure was not taken up heartily in these parts. The amount that colliery owners had to pay for standing or statutory charges for pumping, ventilation, and other necessary work amounted to about one-half of the entire cost of getting coal. It was of the utmost advantage to all coal owners to bring up the pits to their full working capacity. He thought it would be generally admitted that, if the Bill came into operation, the quantity of coal produced would be materially reduced. The standing charges would remain the same; and with the lesser quantity, the only alternative open to them would be to put the price up. He hoped, however, that the Bill would be withdrawn. If it were brought into force, there would be a large introduction of machinery for cutting coal in the Newcastle district. This would have an effect on the miners themselves; and a great many would not be able to find employment.

Mr. Balfour Browne, who followed, said he wished to talk to them on a great economic question, which was raised by the promotion of the Mines Eight-Hours Bill. He did not know whether they had noticed that Parliament generally passed Acts too late. It was always shutting the door, not when the steed had been stolen, but when there was no chance of any horse being taken out of the stable at all. There was no necessity for this Bill. In the last fifty years the wages in the country had increased by 70 per cent.; and in the same period the hours of labour had decreased 20 per cent. Did not this show that the workpeople of the country could, when economic principles admitted, manage their own affairs, without being coddled by Parliament? Did it not show practically that the Bill they had met to discuss was introduced merely because Parliament was always putting its finger into everybody's pie; and when it got its finger in, it made a fearful hash of it? In the last fifteen years there had been fourteen different Bills introduced to limit the hours of adult labour; and one which was introduced by Mr. Cunninghame Graham, in 1902, was to prohibit any person working more than eight hours, or causing or suffering anybody to work on sea or land more than eight hours. The way that such a Bill would work out could be easily imagined. Why was Parliament now seeking to put an eight hours' day upon the miners—the very class that was strongest, by its numbers, its organizations, and its Trade Unions? Why had the miners been chosen to be coddled? Only for the purpose of getting votes. In the House of Commons it had been stated that if the Bill were to become law they would get as much work out of the men, production would not be diminished, trade would not suffer, and competition with foreigners would not be hampered. But they had their doubts. Wages in the coal mines were not paid on the price of labour in the market, but on the price of coal. The Departmental Committee appointed by the Home Secretary had considered the question; and as regarded three matters put before them, they had given very decided answers. One of the suggestions made was that the men would be speeded-up, not hustled; secondly, it was suggested by some witnesses before the Committee that if eight hours were given, many of the collieries might work double shifts; and, thirdly, it was suggested that short days and absenteeism of the workmen might become less if an Eight-Hours Bill were passed. Many of the witnesses said that if they hustled the men there would be a greater number of accidents; as to the double shift, the collieries of South Wales were violently opposed to it; and as to short time and absenteeism, the more wages they gave a man the more holidays would he take. The Bill was a bad one and should not be allowed to pass. An increase of 1s. per ton on coal would, according to the evidence given before the Committee, increase the price of steel from 3s. 6d. to 4s. per ton; and this would in time throw the steel out of the market. Was that a thing to be contemplated with equanimity? Take the case of railways. A 2s. per ton increase in the price of coal meant £1,000,000 a year increase on the railway rates. Their gas must inevitably go up in price; and shareholders' dividends must go down. There was not a single trade in the country that would not suffer if the Bill were passed. It had, as he had said, been promoted for no other purpose than that of getting votes; but it was not necessary, and it was not wanted. The Chairman had referred to the vote taken in Northumberland. Mr. John Wilson, M.P., opposed the Bill because, he said, two of the foremost coal-producing counties in England would be injured; and he went on to remark: "The Bill was unjust to Labour itself, in view of the opportunity which workmen now had for combination. This Bill was a plea for cowardice. They were forgetful of their self-reliance in beseeching the House of Commons to do what, if expediency or the exigencies of trade would allow, they could do for themselves." Mr. Burt had also opposed the Bill, and said he thought it would cripple the industry. He (the speaker) doubted whether the Government believed in the Bill. In it, the fourth clause was as follows: "His Majesty may, in the event of war or imminent national danger, or great emergency, or in the event of any grave economic disturbance due to the demand for coal exceeding the supply available at the time, by Order in Council suspend the operation of this Act to such an extent and for such period as may be named in the Order, either in respect of all coal miners or any class of coal miner." If the Bill was right, it ought to be passed; but if it was going to create any serious disturbance, which the clause contemplated, it should not be passed.

The Chairman then moved the following resolution: "That this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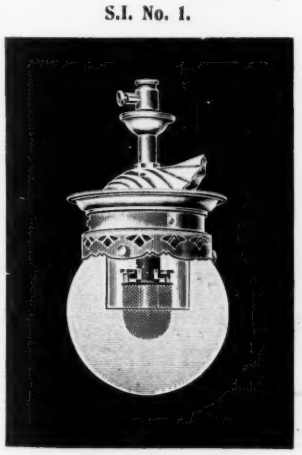

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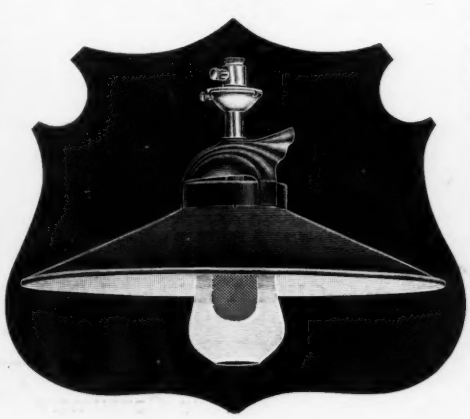

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meeting is of the opinion that if the Coal Mines (Eight-Hours) Bill is passed into law, it will seriously limit the production and increase the price of coal, and will consequently result in injury to the industry of the country, and will add to the number of unemployed. This meeting is, further, of the opinion that the measure is not called for in the interests of the miners, and protests against the Bill being passed into law."

The resolution was seconded by Alderman T. Richardson, and carried unanimously.

## PRESTON CORPORATION WATER SUPPLY.

### Proposed Loan for Water-Works Extensions.

At the Meeting of the Preston Town Council last Thursday, the Water Committee recommended that application should be made to the Local Government Board for sanction to the borrowing of £50,000 for water-works extensions.

In moving the adoption of the recommendation, Alderman Hamilton said it had been suggested to him that the completion of the two reservoirs was not necessary; but it was now seventeen years since the inadequacy of water storage was reported to the Council. Water engineers considered a minimum of 200 days' supply was the proper provision; but when these two reservoirs were completed, the total would be only 138 days' supply. It was also necessary to finish the work on sanitary grounds. As to the capital expenditure on water-works, the supply of a million gallons per day was estimated to entail a capital outlay of £150,000. On the basis of the 5 million gallons daily sent into Preston, the capital should be £750,000; but adding the money now asked for to that already expended, the total would only reach £575,000.

Mr. Mallott moved, as an amendment, that the recommendation be referred back for further discussion, because after the way things had been managed in the past he felt some want of confidence in the future. He said there was no doubt someone had blundered. In 1904, Parliament sanctioned an expenditure of £107,000; and the plans presented showed that £91,000 of this was for making and renewing three reservoirs at Dilworth, Spade Mill, and Alston. No sooner was the money obtained than the plans for Dilworth were altered; and instead of the reservoir costing £8900, it came to over £23,000. He wanted to know who gave instructions for this work to be carried out in an entirely different manner. It had been in the hands of a Sub-Committee of the Water Committee. With regard to Alston, they all knew there was a landslip not long ago on the south bank, to repair which would cost £3000. The puddle trench had slipped 15 feet when he was there first after joining the Water Committee; and he also came to the conclusion that to expend further money on raising the banks of the reservoirs was a mistake. He proposed in Committee that the Alston reservoir banks should not be proceeded with; but the Chairman absolutely refused to put the resolution. He asked the Council to show they had no further confidence in the limited number of gentlemen who had hitherto had the management of the Longridge works.

The amendment having been seconded, a long discussion, in the course of which the Water Committee were sharply criticized, ensued. In reply, Alderman Hamilton said what had been done in the expenditure of the money was done in the best interests of the town. The Sub-Committee when appointed were given full power to carry the work through, and were told they would not be expected to report to the Committee. Not one member of the Sub-Committee knew the reservoir would cost £23,000; but in water undertakings such instances of unexpected cost were common. In the case of Dilworth, after carrying out the work to the depth provided for in the estimates, it was found necessary to go deeper to find a suitable bottom; and this caused much of the increased outlay. He suggested that the time had arrived for the appointment of a Water Engineer for Preston.

Ultimately Mr. Mallott was requested to withdraw his amendment, and he agreed to do so; saying that in putting it it had served its purpose. He, however, would reserve the right to ask any question he thought fit at the Local Government Board inquiry.

The recommendation was then carried unanimously.

**Alliance and Dublin Consumers' Gas Company.**—At the half-yearly general meeting of this Company to-morrow, the Directors will report that the gross receipts in the six months ending the 30th of June amounted to £155,879, and the expenditure, including interest on loan capital, &c., to £127,492; leaving a net profit of £28,387. To this is to be added £195 brought forward; making the total sum available for distribution £28,582. The Directors recommend the declaration of dividends at the rates of 10 and 7 per cent. per annum on the respective shares, the payment of which will amount to £35,007. It will therefore be necessary to draw on the reserve fund to the extent of £6424; but there will then remain an amount of no less than £52,474 to the credit of the fund.

**Public Lighting Dispute at Padstow.**—In consequence of a deadlock having arisen through the Padstow Urban District Council and the Gas Company failing to arrange a contract, a meeting of the former body was held last Tuesday evening. The Chairman (Mr. R. S. Langford) stated that this year the Lighting Committee had tried to arrange terms for lighting 31 lamps, for which the Gas Company demanded £68 15s. The Committee went carefully into the whole question, and felt justified in offering an inclusive sum of £60 for the 31 lamps. The Company, however, refused; and the Council now wished the ratepayers to consider the matter, and advise them whether they should accept the offer. Since this meeting had been called, the Company had reduced their offer to £66. After a discussion, it was decided to uphold the Council's offer.

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## NOTES FROM SCOTLAND.

**From Our Own Correspondent.** *Saturday.*

The valuation of the undertaking of the Edinburgh and Leith Gas Commissioners, as fixed by the Corporations of Edinburgh and Leith, is left in a somewhat mixed position. It will be remembered that last week the Corporation of Leith determined that a value should be placed upon the ground in the streets in which the Commissioners' pipes lie. At the diet at which this course was resolved upon, Mr. J. Duncan Millar appeared on behalf of the Gas Commissioners, who were appellants against the valuation being imposed. Counsel, however, did not press the point, but pleaded for uniformity of valuation within the different areas—a quite reasonable plea. After, however, it had been decided in Leith to impose the valuation, the attitude of the Gas Commissioners towards the question changed. In order to secure uniformity they were obliged to plead in the Edinburgh Court this week (see p. 865) that the valuation of the ground which had not been made by the Assessor in Edinburgh should be made. Mr. Millar, again appearing for the Commissioners, was able to quote authorities from the Supreme Court in support of his view. It was to no purpose. The Corporation of Edinburgh would not have such a valuation—being influenced, doubtless, by the argument, on the other side, that there was a distinction between the case of the Commissioners and the leading case quoted by Mr. Millar. Intimation was given by Mr. Millar of an appeal to the Court of Session against the Edinburgh decision; so that there is a probability of the valuation for the current year being yet placed upon a uniform basis. At present, the situation is that the Gas Commissioners will have to pay burgh and other assessments in Leith upon the value of the ground occupied by their pipes, while in Edinburgh they will not. A word of explanation as to the action of the Gas Commissioners may be given. The gas-works are wholly situated within the Edinburgh area, consequently all that there is to value in Leith is a portion of the distributory system. In the Valuation Acts it is enacted that assessments are to be levied upon only one-fourth of the valuation of the pipes, and that if anything else is taken into account, the value of this something else is to be deducted from the valuation of the gas-works. Had the alteration been made in Edinburgh, the matter would have been as broad as it is long, because what might have been added to the pipes would have been deducted from the works; but being in Leith, where there are no works, the Gas Commissioners have to pay the increased assessment out of their own pocket so to speak. The additional sum upon which assessments will have to be paid in Leith, should the decision of the Valuation Court stand, is about £2600; so that it was worth making an attempt to get rid of. Had the Commissioners succeeded in getting the additional value laid on in Edinburgh, they would have been entitled to reduce the value of the works *quoad* Leith as well as Edinburgh. But the principle of uniformity having been departed from cuts Leith off from having any relationship with the valuation of the works. This explanation is necessary to make clear the unusual step of the Gas Commissioners in appealing against a refusal to increase the valuation. It is uniformity of valuation they are seeking more than variation or reduction of amount. They will probably get what they desire in the Court of Session. If not, they may have it next year, if they choose to ask the Assessor of Railways and Canals to value their undertaking.

Treasurer Wilkie, in submitting the annual accounts of the burgh to the Falkirk Town Council on Monday, said that the gas accounts were not as favourable as they expected. They were practically face to face with a deficit of £2770, which, deducting £1000 which they reckoned to put to the reserve fund, gave an actual deficit of £1770 on the year's working. They had, of course, anticipated a considerable deficit in the gas accounts. Some of them last year pleaded for an increase of 3d. in the price of gas. Then they stuck out for 2d., but only got 1d. While the figures were alarming, it must be remembered that the ratepayers had the benefit in cheap gas. The income of the gas undertaking for the year was £34,652, and the expenditure amounted to £28,249; leaving a gross surplus of £6403, out of which had to be met interest on sinking fund, &c., amounting to £8894. To meet this, £2000 had to be transferred from the reserve fund; leaving a debit balance on the net revenue of £105. There were various causes to account for the deficit, including dear coal and poor yields and increased leakages. Provost Christie, in seconding the approval of the accounts, said they had to regret that there was a deficit on the gas-works. They had had dull trade and dear coal; and this might account for the deficit to some extent. The accounts were approved.

The Kilmarnock Town Council have purchased coal for the year at an average price of 10s. 7·4d. per ton, as compared with 13s. 6d. last year—a saving of 2s. 10·6d per ton, equivalent, on last year's consumption, to £2543. On the recommendation of the Gas Committee, the price of gas has been reduced as from next survey by 2½d.; making it 2s. 6d. per 1000 cubic feet.

In the "Glasgow Herald" on Tuesday, a special article on "Various Turbines: Their Origin and Progress," by Mr. Rankin Kennedy, contained the following passage: Much striving after an internal combustion turbine goes on among inventors, but as yet without effect. It is a strange coincidence that, as the first steam-engine was a steam-turbine, so the first recorded gas or internal-combustion engine was also a turbine. John Barber in 1791 obtained a patent (No. 1833) for a turbine operated by the explosion of a gas and air mixture under pressure or compression. He states that the ignited mixture "rushes out with amazing force and velocity," and impinging on the vanes of a paddle-wheel drives them round rapidly. The changes have been rung on this invention by many subsequent inventors, but without success. The patent records show several proposals of a different nature, but no gas-turbine has as yet made any show of the wheels going round for more than a few revolutions. Still the problems are not unsoluable; and it would not be matter of surprise if the gas-turbine appeared at no distant date.

The Grangemouth Town Council on Monday considered the estimates in connection with the gas undertaking for the current year; and

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after allowing £800 towards sinking fund and £300 towards depreciation, there was, on the basis of the price of gas remaining at 3s. 4d. per 1000 cubic feet, a surplus shown of £299. The Council adopted the estimates and continued the price of gas as at present.

Early on Thursday morning, a fire broke out in the works of the Forres Gaslight Company, Limited. The fire was confined to the engine-room, which was destroyed; the probable loss, which is covered by insurance, being stated at £150. The firemen succeeded in preventing the flames spreading to the other parts of the works.

A dispute has arisen between the District Sub-Committee of the County Council and the Douglas (Lanarkshire) Gaslight Company as to the terms for public lighting. Recently a public meeting on the subject was held in the Town Hall; and in terms of resolutions then adopted, a meeting between the Sub-Committee and representatives of the Gas Company was held with a view to arrangements being come to for having the lighting of the streets started for the season. The position taken up by the Company is that, since the introduction of incandescent gas-burners, the consumption of gas, as shown by the meters, is too small, and they now insist upon a fixed charge per lamp, instead of, as hitherto, charging 5s. per 1000 cubic feet, less 5 per cent. discount. They also suggest that the meters employed have not worked properly, or have not registered correctly; and also that the place has been imperfectly lighted. The Sub-Committee, on the other hand, consider that they would not be justified in paying for more gas than is consumed; but they have offered to allow the Gas Company to engage and to give orders to the lamplighter (the Sub-Committee paying him), and to supply two or more meters, properly tested before commencing. At the conference the representatives of the Gas Company declined to move from their position; and the consequence is that the streets remain unlighted.

The Montrose Gaslight Company, of which Mr. A. Mackay is Engineer and Manager, have inaugurated a system of dealing in gas-stoves which is worthy of attention. They announce by advertisement that they now supply and fix up gas cooking-stoves entirely free of charge, subject to an agreement as to a minimum consumption of gas, according to the size of the stove supplied. The conditions are that stoves up to a net value of £5 are supplied on loan free of hire; stoves of greater value are charged hire or rent at the rate of 10 per cent. per annum on the excess of the cost above £5—a special arrangement being made before fixing. Consumers must guarantee a minimum consumption of gas, stipulated at 8000 cubic feet per annum for a No. 1 cooker, 10,000 cubic feet for a No. 2, 12,000 cubic feet for a No. 3, 14,000 cubic feet for a No. 4, and 16,000 cubic feet for a No. 5. If short of these quantities, the balance must be paid to the Company. The stove is to be kept in use for not less than one year; and if removed earlier at the request of the consumer, the latter must pay the cost of connection, fixing, and removing. Boiling rings and grillers are fitted up with composition piping free; but when fitted with flexible tubing extra, the tubing is paid for by the consumer. The terms are very generous, and should lead to a considerable increase in the consumption of gas.

On Wednesday last, an augmentation to the water supply of the burgh of Inverurie, in Aberdeenshire, was inaugurated. The existing water supply was introduced thirty-two years ago, under the direction of Mr. G. G. Jenkins, C.E., of Aberdeen, who has also been the adviser of the Town Council on the present occasion. The augmented supply is derived from the farm of Mill of Eastertown, nearly seven miles from the town. This farm it was necessary to purchase from Lord Leith of Fyvie, which was done at a cost of £3000. The works, in addition, have cost about £7000. The gathering ground, extending to 500 acres, is 200 feet above the level of the burgh. Collecting pipes have been laid over a length of 700 feet—in no instance at a less depth than 10 feet from the surface, and almost exclusively in seamy rock. The water is led in a cast-iron pipe of 8 inches diameter to an elevated tank near the town. The supply is equal to 43 gallons per head per day to a population of 4500. The quality of the water is said to be excellent.

## CURRENT SALES OF GAS PRODUCTS.

**Sulphate of Ammonia.** LIVERPOOL, *Sept.* 26.

Owing to continued absence of orders from abroad, the market has been inactive; and though the quantity offered has not been so large as it was last week, a further decline in values has to be recorded at the close. Quotations now are £11 2s. 6d. per ton f.o.b. Hull, £11 5s. per ton f.o.b. Liverpool, and £11 7s. 6d. per ton f.o.b. Leith. For forward delivery no transactions are reported; the premium required by makers failing to attract any attention.

**Nitrate of Soda.**

Spot prices have been reduced 3d. per cwt.; quotations now being 9s. 7½d. for ordinary, and 9s. 10½d. for refined.

**Tar Products.** LONDON, *Sept.* 28.

The markets for tar products have been steadier throughout the past week. Pitch is decidedly firmer, and the price is advancing; good figures having been paid upon both the east and west coast for prompt and forward delivery. There is not very much buying from the Continent; but there are signs that consumers are far more disposed to do business than was the case a week or two ago. Creosote is firm, and maintains its price well, especially in the Midlands, where there appears to be a decided shortage of oil. In the Yorkshire district also very high figures are spoken of; but in Lancashire makers are more reasonable in their ideas. Benzol is quiet, but prices are unchanged. 50-90 per cent. is dull, and sales are difficult to negotiate. Toluol has improved for delivery to the end of the year. Solvent is steady, and there is a slightly improved demand, though there is practically no alteration in price. Carbolic 60's are very quiet. There are sellers on the east coast at 1s. 2½d.; but buyers will not pay this figure. Naph-


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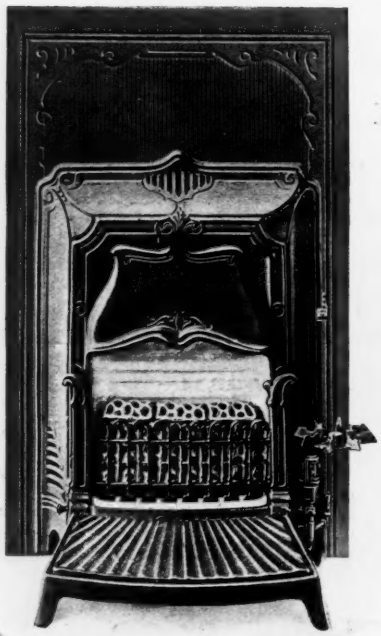

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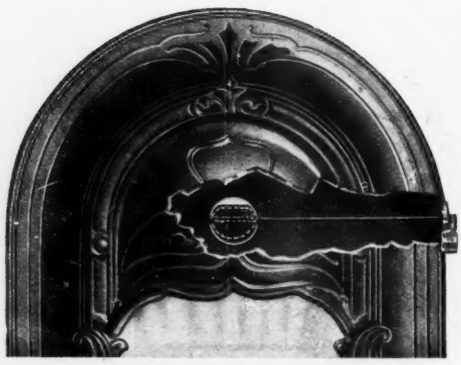

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thalene is dull, and there is little demand for same. Salts are quiet; but makers are not particularly anxious to sell owing to the good inquiry for creosote. Tar has greatly improved in price in view of the better outlook for products.

The average values during the week were: Tar, 12s. 3d. to 16s. 3d., *ex* works. Pitch, London, 20s. 6d. to 21s.; east coast, 19s. 6d. to 20s. 6d.; west coast, 19s. to 21s. f.a.s. Benzol, 90 per cent., casks included, London, 7d. to 7¼d.; North, 6⅝d. to 6⅞d.; 50-90 per cent., casks included, North, 6⅞d to 7¼d.; London, 7d. to 7¼d. Toluol, casks included, London, 8d. to 8¼d.; North, 8d. to 8¼d. Crude naphtha, in bulk, North, 3¼d. to 3⅜d.; London, 3⅜d. to 3½d.; solvent naphtha, casks included, London, 10¼d.; North, 9¼d.; heavy naphtha, casks included, North, 9d. to 9½d.; London, 10d. to 10⅛d. Creosote, in bulk, London, 2¾d. to 2⅞d.; North, 2⅝d. to 2¾d. Heavy oils, in bulk, 3d. to 3 1/16d. Carbolic acid, 60 per cent., casks included, east coast, 1s. 2d. to 1s. 2½d.; west coast, 1s. 1½d. to 1s. 2d. Naphthalene, £4 to £8; salts, 32s. 6d. to 35s., casks included and f.o.b. Anthracene, "A" quality, 1⅛d. to 1¾d. per unit, casks included and delivered.

**Sulphate of Ammonia.**

This article has been quiet throughout the past week, and prices have with difficulty been maintained. In London, the principal Gas Companies keep to their former figures for forward. Outside London makes can be secured at £11 5s. on Beckton terms. In Hull, the best makes have been let at £11 5s.; while in Liverpool, the price is £11 6s. 3d. to £11 7s. 6d. It is very difficult to ascertain what is the actual position of affairs in Leith, where the prices asked by makers are much in advance of the dealers' ideas. It is understood, however, that the actual value is about £11 8s. 9d. to £11 10s. for prompt, and £11 15s. for forward.

## COAL TRADE REPORTS.

**Northern Coal Trade.**

There is a rather weaker demand for steam coals; but that for gas and manufacturing sorts is fuller, and there is some tendency to higher prices for the latter kind. In the steam coal trade, the demand is less for forward supplies; while for those for prompt delivery, the quotation is about 13s. 3d. to 13s. 6d. per ton f.o.b. for best Northumbrian sorts. Second-class steams are from 10s. 10½d. to 11s. 6d. per ton, and steam smalls from 5s. to 6s. The output at the collieries is fair, and is well taken up generally. In the gas coal trade, there is a better demand—not only from the usual growth at this season of the year, but because the end of the engineering strike starts many establishments which are large consumers of gas both for light and power. Durham gas coals vary from about 10s. to 11s. per ton f.o.b., according to quality, for the usual kinds; and for "Wear specials," from 11s. 9d. to 12s. is the f.o.b. quotation. Contracts are now very scarce; so much of the coal being contracted for. A few sales, however, have been made for export to some of the Mediterranean ports over the next few months, at somewhere near the current prices. Coke is steady, and gas coke is quoted at relatively high prices—good descriptions being from about 16s. to 17s. per ton f.o.b. in the Tyne.

**Scotch Coal Trade.**

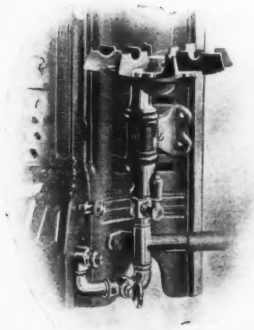
Coal did not move off freely last week, on account of fog delaying business at the ports. The home demand kept well up, though it by no means improved. The prices quoted are: Ell 10s. 6d. to 12s. 6d. per ton f.o.b. Glasgow, splint 11s. to 11s. 3d., and steam 10s. 3d. to 10s. 6d. The shipments for the week amounted to 335,433 tons—a decrease of 2512 tons upon the previous week, but an increase of 37,467 tons upon the corresponding week of last year. For the year to date, the total shipments have been 10,304,811 tons—a decrease upon the corresponding period of 336,084 tons.

**Exmouth Gas Company.**—A very satisfactory statement was presented at the half-yearly meeting of the Exmouth Gas Company, over which the Rev. C. R. Carr presided, last Friday. The Directors' report set forth that, owing to the high price of coal, the proportion of profit showed some diminution as compared with recent years; but in all other respects the accounts might be considered quite satisfactory. The cost of coal amounted to £3085, which was an increase of nearly £600 for the half year; and this affected the balance carried to the profit and loss account. The Chairman said that, despite the higher price of coal, they had not increased the price of gas. Coal contracts for next year had been made on better terms. The report and balance-sheet were adopted, and the usual dividends approved; and the Secretary and Manager and staff were thanked for their services.

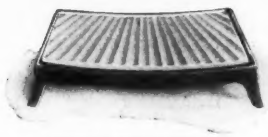
**Bankruptcy of an Engineer.**—At the London Bankruptcy Court last Tuesday, before Mr. Registrar Hope, the public examination was held of Mr. Edward Parker Milne, described as a heating engineer, of No. 15, Craven Street, Charing Cross, and No. 1, Pocock Street, Blackfriars. The summary of accounts filed by the debtor disclosed liabilities amounting to £4474, of which £4334 was expected to rank against the estate for dividend. The assets were returned at £340. In reply to questions put by the Assistant Official Receiver, the debtor stated that he commenced business at Lancaster in 1878. He came to London in 1893, when he had a capital of £750, and invested the money in a company—being appointed managing-director at a salary of £250 per annum. The company was not successful; and he lost the whole of his capital. In 1898, he commenced business as a gas engineer at Craven Street; and in March, 1902, he was joined in partnership by another person, who retired in 1904, after which debtor continued the business alone. In the following year he took a warehouse at Pocock Street. He alleged his failure to have been caused through bad trade during the past two years, and loss of an action to recover money owing to him. The debtor was eventually allowed to pass his examination.


# MOND'S

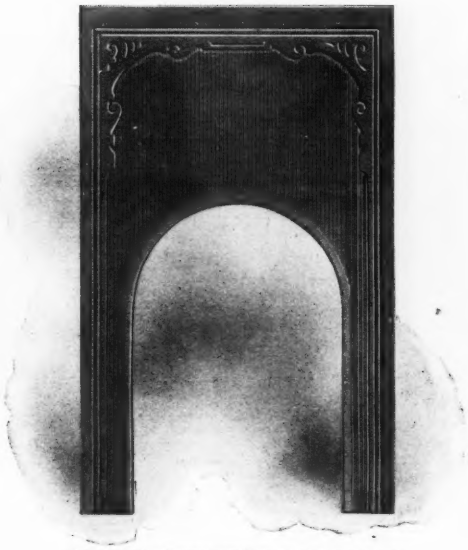
# 08



Swivel Boiling Burner—can be attached to 11 different sizes of Fires.



Copper Reflector Fender.



Ornamental Cast-Iron Back with side wings to fit any grate.

# C." Gas Fire Series.

London Offices and Show-Rooms: 132, Queen Victoria Street, E.C. General Offices and Works: Warrington.

**The Public Lighting Question at Thetford.**—At a special meeting of the Thetford Town Council last Thursday, the Mayor (Alderman F. H. Millington) presiding, the amended contract with the Gas Company for lighting the public lamps was presented and accepted. Accompanying the contract was a letter stating that the Company, as a result of their interview with the Mayor, had agreed to allow a rebate of £10, without prejudice, on the balance of £59 due to them on last year's contract, as a solution of the difficulty between the Council and the Company.

**Glenboig Union Fire-Clay Company, Limited.**—The accounts of this Company for the year ending Aug. 31 last, after providing for maintenance of works and for current charges, and including £2577 brought forward, show, subject to completed audit, a gross profit of £22,180. The Directors recommend the disposal of this sum as follows: For depreciation on capital expenditure, £5000; and in payment of a dividend at the rate of 10 per cent., free of income-tax, £15,000. This will leave a balance of £2180 to be carried forward. For the previous year, the dividend was at the rate of 10 per cent., with a bonus of 2½ per cent.; and in addition to £5000 being set aside for depreciation, £3000 was placed to the reserve fund.

**Public Lighting of Dublin.**—The Dublin Lighting Committee are of opinion that the time has arrived when the electricity undertaking should obtain at least a share of the ordinary street lighting, as distinguished from arc lamp lighting; the proposal being to substitute incandescent metallic filament lamps for the existing gas-lamps, which it is stated can be done at an annual cost of £4 each, or not much in excess of the cost of the gas-lamps. Mr. Murray has therefore given notice of motion for the next meeting of the Corporation to have all the streets of the city in which cables have been laid lighted by electricity. It is suggested that the gas-standards, which are the property of the Corporation, should be utilized for Osram lamps; the initial expenditure being estimated at about 10s. per lamp. There are stated to be 3000 gas-lamps in the City; and in the event of the motion being carried, about 1500 of these will be converted into electric lamps.

**Gas v. Electricity in Artisans' Dwellings.**—At a meeting of the St. Pancras Borough Council last Wednesday week, the Public Health Committee reported having considered a statement from the Medical Officer of Health (Dr. J. F. J. Sykes) in regard to the advisability of providing gas for tenants at Goldington Buildings. The Medical Officer said there had for some time been several dwellings vacant in these buildings; and, according to the caretaker, most of the applicants who had viewed them had complained of the absence of gas. Dr. Sykes suggested that the Gaslight and Coke Company should be asked to lay on gas to all the dwellings in the buildings, for the purposes of cooking and heating, on the same terms as at the Council's Flaxman Terrace Buildings. The Committee accordingly recommended that this should be done; but consideration of the matter was adjourned until the next meeting of the Council, which took place last Wednesday, when the recommendation was adopted.

**Sand Filters for Croydon.**—The Water Committee of the Croydon Corporation have notified their intention of proceeding with the construction of open sand filters in connection with the Addington water supply, at an estimated cost of £9000. The work is to be carried out by direct labour.

**Gas-Coal Contracts.**—The Gas Committee of the Leeds Corporation have for some time past been in the market seeking supplies of coal for their three works, and, according to the "Yorkshire Post," they have succeeded in purchasing a very large proportion at an average reduction of from 1s. to 1s. 3d. per ton on the figures of last year. The Committee consume upwards of 300,000 tons of coal annually. At the meeting of the Brighouse Town Council last Wednesday, the Chairman of the Gas Committee (Alderman Healey) stated that when the tenders for coal first came in they showed a reduction of only 6d. per ton off last year's prices. This the Committee did not consider sufficient, and the result was that they waited a month before deciding. Following upon further negotiations, they had now fixed the contracts at 1s. per ton less than those for last year.

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It has been decided by representatives of the authorities interested to request the Glamorgan County Council to promote a Bill in the next session of Parliament for the formation of a Water Board.

The Directors of the Buenos Ayres (New) Gas Company, Limited, have declared an interim dividend at the rate of 6 per cent. per annum for the six months ending the 30th of June; being 6s. per share, free of income-tax.

Mr. Richard Sandell and Mr. William Brotherton have resigned their connection with the Aston Tube-Works, and in future will represent the Anchor Tube Company, of Birmingham, at the same address as hitherto, No. 146, Dashwood House, E.C.

The East Cowes Urban District Council have satisfactorily solved the difficulty they have experienced in connection with the shortage of their water supply. A "Pulsometer" pump has been installed, the old and new wells connected with a 3-inch pipe, and an average increase of 2500 gallons of water per hour obtained.

The Pneumatic Gas Lighting Company, Limited, of No. 36, Farringdon Street, E.C., have just completed an installation of their pneumatic lighters in the Wormwood Scrubbs Convict Prison. They have also finished an installation of their lighter in the second London County Council Fire Station—that at Notting Hill Gate.

Messrs. Newton, Chambers, and Co., of Sheffield, have given an order to Messrs. C. & W. Walker, Limited, of Donnington, Shropshire, for four sets of Milbourne's patent automatic rapid cover-fasteners, to be supplied and fixed to the new purifiers being erected at the Linacre works of the Liverpool United Gas Company. This makes the fourth repeat order received for these patent fasteners for the Liverpool Company, as they are already in operation on purifiers at the Athol Street, Garston, and Eccles Street Gas-Works.


# DESIGNS WHICH HAVE NEVER BEEN SURPASSED.

The "CANTERBURY." Price 45s.

The "MELROSE." Price 40s.

## R. & A. MAIN, LTD., 49, Queen Victoria Street, LONDON, E.C.

**And at GLASGOW, BIRMINGHAM, BRISTOL, and MANCHESTER.**

The Kirkburton Gas Company have placed an order with Messrs. Robert Dempster and Sons, Limited, of Elland, for a steel tank, 65 feet diameter by 20 ft. 6 in. deep, and a two-lift spiral-guided gasholder. The work is to be carried out to plans and specifications prepared by, and under the supervision of, Mr. John H. Brearley, of Longwood.

A highly appreciated addition to the comfort of the men employed at the Sculcoates works at Hull of the British Gaslight Company has been made by the provision of a new mess-room, which was opened some days ago. The large dining-hall, in which there is accommodation for 300 men, is divided into two parts—one portion for the yard men and the other end for the stokers. There is a kitchen half way down the hall; and a cook is employed by the Company, so that every workman is able to get his meal freshly cooked and hot if he wishes. Attached to the dining-hall there are lavatories and hand basins, a shower bath, &c. An additional improvement is a compartment alongside the mess-room for lockers, which are provided for 300 men—the Company employing an attendant to look after them. Every workman is allotted a locker. When he arrives he changes his clothes; and the locker is left safely in the hands of the attendant, who is always on duty. The use of the mess-room is entirely free. A smoking concert, when about 400 employees enjoyed the hospitality of the Company to inaugurate the venture, was presided over by Mr. John Young, the Engineer, who pointed out that the accommodation had been provided by the Directors for the comfort and welfare of the men, and he hoped they would co-operate to make the mess-room attractive and bright. He believed it would prove a very great boon. A vote of thanks was heartily accorded to the Directors.

## NEW CATALOGUES.

Messrs. Falk, Stadelmann, and Co., Limited, of Farringdon Road, E.C., have issued their supplementary gas-fittings and accessories list, No. 276, for the season 1908-9. It contains illustrations and particulars of a wide range of cheap and useful fittings for both upright and inverted incandescent burners, and of outdoor and indoor high-power lamps.

A compact illustrated list of the specialities for the forthcoming lighting season to be had of Messrs. A. E. Podmore and Co., of No. 33, Charles Street, Hatton Garden, E.C., gives particulars of high-power lamps for interior and exterior lighting. Two forms of anti-vibrating billiard table lights are illustrated, as well as the "Podmore" nickel-plated light, with patent inverted burner, for desk or shop-window case lighting. It is fitted with an anti-vibrator arrangement, and is suitable for square or circular reflecting shades. The list is folded so as to come within very small compass.

We have received from Messrs. John J. Griffin and Sons, Limited, of Kingsway, W.C., a copy of a new edition of the list of Kahlbaum's (Berlin) organic and inorganic chemicals and volumetric solutions. A great many additional preparations appear in this list, which is regarded as a really comprehensive index to laboratory reagents. It may be mentioned that all the chemical preparations listed are represented in Messrs. Griffin's London stock. In addition, of course, to the chemicals themselves, this firm supply all kinds of instruments and appliances required by chemists to enable them to carry out their investigations.

## APPLICATIONS FOR LETTERS PATENT.

19,018.—Barnsley, P. G., "Gas heating furnaces." Sept. 10.
19,055.—Greenlaw, W. A., and Royce, H. A., "Ball-and-socket joints for pipes." Sept. 10.
19,094.—Helps, G., "Gas-burners." Sept. 11.
19,096.—Kissel, F., "Billiard light pendant." Sept. 11.
19,109.—Keith, J., and Tuson, C., "Electrically operated valve-controlling devices." Sept. 11.
19,111.—Snellgrove, H. W., "Gas cooking appliance." Sept. 11.
19,183.—Woods, R. S., "Gasaliers." Sept. 12.
19,188.—Potter, W. G., "Mantles." Sept. 12.
19,228.—Price, T. E., "Incandescent burners." Sept. 12.
19,229.—Lilley, A. E., "Taps or cocks." Sept. 12.
19,249.—Coates, J., and Webb, L. S., "Acetylene generators." Sept. 14.
19,264.—Actien Gesellschaft für Kohlendestillation and Hulbeck, L., "Regenerative furnaces." Sept. 14.
19,278.—Gordon, J., and Jackson, T., "Governors." Sept. 14.
19,315.—Ruppert, H., "Automatic ignition of gas." Sept. 14.
19,337.—Graf, A., and Jarrett, J. A., "Manufacture of combustible smokeless and odourless gas." Sept. 15.
19,363.—Pettibone, H., "Manufacturing gas." Sept. 15.
19,371.—Philpott, T. S., "Gas-burners." Sept. 15.
19,385.—Drabble, H., "Toasting appliances for gas." Sept. 15.
19,437.—Dempster, R., and Sons, Ltd., and Toogood, H. J., "Charging vertical retorts." Sept. 16.
19,438.—The Richmond Gas Stove and Meter Company, Ltd., and Staples, C. W., "Supplying of gas to advertising apparatus." Sept. 16.
19,460.—Rickwood, H. J., "Gas cooking-stoves." Sept. 16.
19,496.—Boughton, H. F., and Pudney, F., "Incandescent burners." Sept. 16.
19,545.—Guilbert, A., "Acetylene lamps." Sept. 17.
19,557.—Broad, C. C., "Generating gas." Sept. 17.
19,577.—Chipperfield, W. H., "High-pressure burners." Sept. 17.
19,628.—Parkinson, B. R., and Woodall, H., "Securing the ends of service-pipes to mains." Sept. 18.
19,664.—Pust, J. R., and Kneister, F., "Composite fuel gas and steam engines." Sept. 18.
19,678.—Gaudet, A., "Pressure regulating device for gas." Sept. 18.
19,722.—Cowper-Smith, M. G., "Automatic gas lighting." Sept. 19.
19,723.—Chandler, S. & J., "Incandescent lamps." Sept. 19.
19,731.—Marillier, F. W., Still, E. H., and Adamson, A. G., "Incandescent burners." Sept. 19.


THE PARKINSON STOVE CO.

have a number of attractive and inexpensive designs in Gas Fires, &c., suitable for hiring out.

PARTICULARS WILL BE SENT YOU IN A .. DAY OR SO. ..

*The* "ONYX."

With 13 inch fire opening

Gas and Air adjuster.

New pattern Fuel giving most efficient and economical results.

THE PARKINSON STOVE COMPANY, LTD.,

Stour Street, Spring Hill,

BIRMINGHAM.

## "ILLUMINATING TRUTHS."

### LEAFLETS FOR DISTRIBUTION.

No. 1.—"The Sanitary Aspects of Gas and Electric Lighting."
No. 2.—"The Cleanliness of Illuminants: The Eyesight."
No. 3.—"Fire Risks."
No. 4.—"The Relative Cost of Gas and Electricity, and Matters affecting it."
No. 5.—"On Reliability, with Instances of Misplaced Confidence."
No. 6.—"On Shop Lighting, with Special Reference to the Flame Arc Lamp."
No. 7.—"The Osram Lamp: Fiction and Fact."

*This series of Leaflets will be useful, not only for distribution among Householders generally, but for circulation among Shareholders to fortify them with arguments in defence of the commodity in which they have invested capital. Copies of each Leaflet should also be kept in every Gas Undertaking's Show-Rooms.*

*Prices for Quantities on Application to* WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.


## WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

**Situations Vacant.**

AGENTS (Paint for Cement and Iron), Lechler, P., Stuttgart.
MANAGER. No. 4995.

**Situations Wanted.**

WATER-GAS MAKER. No. 4994.
MANAGER OR ASSISTANT. No. 4988.

**Correspondence Classes.**

LEES, H., Hexham.

**Stocks and Shares.**

GREAT YARMOUTH WATER COMPANY. Oct. 20.
HIGH WYCOMBE GAS COMPANY. Oct. 20.
SOUTHEND GAS COMPANY. Oct. 20.
SWANAGE GAS AND WATER COMPANY. Oct. 20.

**TENDERS FOR**

**Coke.**

HUDDERSFIELD GAS DEPARTMENT. Tenders by Oct. 14.

**Lamps and Lamp-Columns.**

CUDWORTH URBAN DISTRICT COUNCIL. Tenders by Oct. 12.

**Pipes, &c., and Pipe Laying.**

CUDWORTH URBAN DISTRICT COUNCIL. Tenders by Oct. 12.
PLYMOUTH WATER DEPARTMENT. Tenders by Oct. 14.
REDDITCH GAS COMPANY. Tenders by Oct. 17.

## GAS COMPANIES' STOCK AND SHARE LIST.

**Referred to on p. 837.**

| Issue. | Share. | When ex-Dividend. | Dividend or Dividend & Bonus. | NAME. | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment. |
|---|---|---|---|---|---|---|---|
| £ | | | p.c. | | | | £ s. d. |
| 590,000 | 10 | Apl. 10 | 10 | Alliance & Dublin 10 p.c. | 19–20 | –½ | 5 0 0 |
| 268,324 | 10 | ,, | 7 | Do. 7 p.c. | 13–14 | –½ | 5 0 0 |
| 310,000 | Stk. | July 15 | 4 | Do. 4 p.c. Deb. | 99–102 | .. | 3 18 5 |
| 200,000 | 5 | May 29 | 6½ | Bombay, Ltd. | 5¾–6¾ | .. | 5 4 0 |
| 40,000 | 5 | ,, | 6½ | Do. New, £4 paid | 4–4¼ | .. | 5 15 7 |
| 50,000 | 10 | Aug. 27 | 14 | Bourne-mouth Gas and Water } 10 p.c. | 28–29 | .. | 4 16 6 |
| 51,810 | 10 | ,, | 7 | } B 7 p.c. | 16½–16¾ | .. | 4 3 7 |
| 53,200 | 10 | ,, | 6 | } Pref. 6 p.c. | 15–16 | .. | 3 15 0 |
| 380,000 | Stk. | Aug. 13 | 12½ | Brentford Consolidated | 244–249 | .. | 5 0 5 |
| 300,000 | ,, | ,, | 9½ | Do. New | 181–186 | .. | 5 2 2 |
| 50,000 | ,, | ,, | 5 | Do. 5 p.c. Pref. | 120–125 | .. | 4 0 0 |
| 206,250 | ,, | June 12 | 4 | Do. 4 p.c. Deb. | 100–105 | .. | 3 16 2 |
| 220,000 | Stk. | Sep. 11 | 10⅝ | Brighton & Hove Orig. | 205–210* | .. | 5 2 4 |
| 246,320 | ,, | ,, | 7⅝ | Do. A. Ord. Stk. | 150–155* | .. | 5 0 0 |
| 460,000 | 20 | Mch. 27 | 10 | British | 42–43 | .. | 4 13 0 |
| 109,000 | Stk. | Aug. 27 | 6 | Bromley, Ord. 5 p.c. | 113–116 | .. | 5 3 5 |
| 165,700 | ,, | ,, | 4½ | Do. do. 3½ p.c. | 84–86 | .. | 5 4 8 |
| 500,000 | 10 | May 14 | 7 | Buenos Ayres (New) Ltd. | 11½–11⅝ | .. | 5 19 1 |
| 250,000 | Stk. | June 26 | 4 | Do. 4 p.c. Deb. | 92–94 | .. | 4 5 1 |
| 150,000 | 20 | July 15 | 7½ | Cagliari, Ltd. | 24–25 | .. | 5 16 0 |
| 100,000 | 10 | — | — | Cape Town & Dis., Ltd. | 4–6 | .. | — |
| 100,000 | 10 | Apl. 26 | 4½ | Do. 4½ p.c Pref. | 5–7 | .. | 6 8 7 |
| 50,000 | 50 | May 2 | 6 | Do. 6 p.c. 1st Mort. | 48–50 | .. | 6 0 0 |
| 100,000 | Stk. | June 26 | 4½ | Do. 4½ p.c. Deb. Stk. | 78–83 | .. | 5 8 5 |
| 157,150 | Stk. | Aug. 13 | 5 | Chester 5 p.c. Ord. | 108⅜–110½ | .. | 4 12 7 |
| 1,493,280 | Stk. | Aug. 27 | 5⅝ | Commercial 4 p.c Stk. | 105–110 | .. | 4 14 6 |
| 560,000 | ,, | ,, | 5 | Do. 3½ p.c. do. | 101–103 | .. | 4 17 1 |
| 475,000 | ,, | June 26 | 3 | Do. 3 p.c. Deb. Stk. | 82–84 | .. | 3 11 5 |
| 800,000 | Stk. | June 12 | 6½ | Continental Union, Ltd. | 108–113 | .. | 5 15 0 |
| 200,000 | ,, | ,, | 7 | Do. 7 p.c. Pref. | 137–142 | .. | 4 18 7 |
| 460,170 | Stk. | — | 5 | Derby Con. Stk. | 122–124 | .. | 4 0 8 |
| 55,000 | ,, | — | 4 | Do. Deb. Stk. | 103–105 | .. | 3 16 2 |
| 148,995 | ,, | Mch. 31 | 5 | East Hull 5 p.c. Ord. | 100–103 | .. | 4 17 1 |
| 486,090 | 10 | July 15 | 12 | European, Ltd. | 23–24 | +½ | 5 0 0 |
| 354,060 | 10 | ,, | 12 | Do. £7 10s. paid | 16½–17½ | .. | 5 2 10 |
| 15,182,590 | Stk. | Aug. 13 | 4/10/8 | Gas-light and Coke } 4 p.c. Ord. | 99–100 | –½ | 4 10 8 |
| 2,600,000 | ,, | ,, | 3½ | } 3½ p.c. max. | 87–89 | .. | 3 18 8 |
| 3,799,735 | ,, | ,, | 4 | } 4 p.c. Con. Pref. | 105–107 | +½ | 3 14 9 |
| 4,193,975 | ,, | June 12 | 3 | } 3 p.c. Con. Deb. | 85–87 | .. | 3 8 11 |
| 258,740 | Stk. | Sep. 11 | 4⅜ | Hastings & St. L. 3½ p.c. | 93–95* | .. | 4 16 11 |
| 82,500 | ,, | ,, | 6¼ | Do. do. 5 p.c. | 112–115* | .. | 5 8 8 |
| 70,000 | 10 | Apl. 29 | 11 | Hongkong & China, Ltd. | 18–19 | .. | 5 15 9 |
| 4,940,000 | Stk. | May 14 | 8 | Imperial Continental | 181–183 | .. | 4 7 5 |
| 473,600 | Stk. | Aug. 13 | 3½ | Do. 3½ p.c. Deb. Red. | 94–96 | .. | 3 12 11 |
| 195,242 | Stk. | Aug. 27 | 6 | Lea Bridge Ord. 5 p.c. | 116–120 | .. | 5 0 0 |

| Issue | Share. | When ex-Dividend. | Dividend or Dividend & Bonus. | NAME. | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment. |
|---|---|---|---|---|---|---|---|
| £ | | | p.c. | | | | £ s. d. |
| 561,000 | Stk. | Aug. 27 | 10 | Liverpool United A | 227–229 | .. | 4 7 4 |
| 718,100 | ,, | ,, | 7 | Do. B | 164½–166½ | .. | 4 4 1 |
| 306,083 | ,, | June 26 | 4 | Do. Deb. Stk. | 104–106 | .. | 3 15 6 |
| 75,000 | 5 | June 26 | 6 | Malta & Medn., Ltd. | 4⅞–5⅛ | .. | 6 6 4 |
| 560,000 | 100 | Apl. 1 | 5 | Met. of } 5 p.c. Deb. | 101–103 | .. | 4 17 1 |
| 250,000 | 100 | ,, | 4½ | Melbourne } 4½ p.c. Deb. | 101–103 | .. | 4 7 5 |
| 541,920 | 20 | May 29 | 3½ | Monte Video, Ltd. | 11⅛–12⅛ | +⅛ | 5 12 0 |
| 1,775,892 | Stk. | July 30 | 4/12/6 | Newc'tle & G'tesh'd Con. | 107⅜–108½ | +½ | 4 5 3 |
| 418,460 | Stk. | June 26 | 3½ | Do. 3½ p.c. Deb. | 90–92 | .. | 3 16 1 |
| 15,000 | 10 | Aug. 27 | 10 | North Middlesex 10 p.c. | 19½–20½ | .. | 4 17 6 |
| 55,940 | 10 | ,, | 7 | Do. 7 p.c. | 13–14 | .. | 5 0 0 |
| 300,000 | Stk. | Apl. 29 | 8 | Oriental, Ltd. | 140–143 | .. | 5 11 11 |
| 60,000 | 5 | Mch. 27 | 8½ | Ottoman, Ltd. | 6–6¼ | .. | 6 3 1 |
| 398,490 | 5 | Apl. 29 | 7 | Primitiva Ord. | 5⅞–6⅛ | .. | 5 12 0 |
| 796,980 | 5 | July 30 | 5 | Do. 5 p.c. Pref. | 4⅝–5⅛ | .. | 4 17 7 |
| 488,900 | 100 | June 1 | 4 | Do. 4 p.c. Deb. | 96–98 | +1 | 4 1 8 |
| 1,000,000 | 10 | Apl. 29 | 8 | River Plate Ord. | 13½–13⅝ | .. | 5 16 5 |
| 312,650 | Stk. | June 26 | 4 | Do. 4 p.c. Deb. | 92–94 | .. | 4 5 1 |
| 250,000 | 10 | Apl. 10 | 8 | San Paulo, Ltd. | 13⅞–14¼ | +⅛ | 5 12 3 |
| 125,000 | 50 | July 1 | 5 | Do. 5 p.c. Deb. | 49–51 | .. | 4 18 0 |
| 135,000 | Stk. | Sept. 11 | 10 | Sheffield A | 239–241* | –½ | 4 3 0 |
| 209,984 | ,, | ,, | 10 | Do. B | 239–241* | .. | 4 3 0 |
| 523,500 | ,, | ,, | 10 | Do. C | 238–240* | .. | 4 3 4 |
| 70,000 | 10 | May 29 | 10 | South African | 13½–14½ | +½ | 6 17 11 |
| 6,429,895 | Stk. | Aug. 13 | 5/6/8 | South Met., 4 p.c. Ord. | 120–122 | .. | 4 7 4 |
| 1,895,445 | ,, | July 15 | 3 | Do. 3 p.c. Deb. | 84–86 | .. | 3 9 9 |
| 209,820 | Stk | Aug. 31 | 8 | South Shields Con. Stk. | 152–154 | .. | 5 3 10 |
| 605,000 | Stk. | Aug. 13 | 5/6/8 | S'th Suburb'n Ord. 5 p.c. | 115–118 | .. | 4 10 4 |
| 60,000 | ,, | ,, | 5 | Do. 5 p.c. Pref. | 117–122 | .. | 4 2 0 |
| 117,058 | ,, | July 15 | 5 | Do. 5 p.c. Deb. Stk. | 120–125 | .. | 4 0 0 |
| 502,310 | Stk. | May 14 | 5 | Southampton Ord. | 108–113 | .. | 4 8 6 |
| 120,000 | Stk. | Aug. 13 | 6¼ | Tottenham and Edmonton } A 5 p.c. | 132–137 | .. | 4 18 6 |
| 398,940 | ,, | ,, | 5¼ | } B 3½ p.c. | 105–108 | .. | 4 17 3 |
| 149,470 | ,, | June 26 | 4 | } 4 p.c. Deb. | 100–105 | .. | 3 16 2 |
| 182,380 | 10 | June 12 | 8 | Tuscan, Ltd. | 10–10½ | .. | 7 12 4 |
| 149,900 | 10 | July 1 | 5 | Do. 5 p.c. Deb. Red. | 99–101 | .. | 4 19 0 |
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